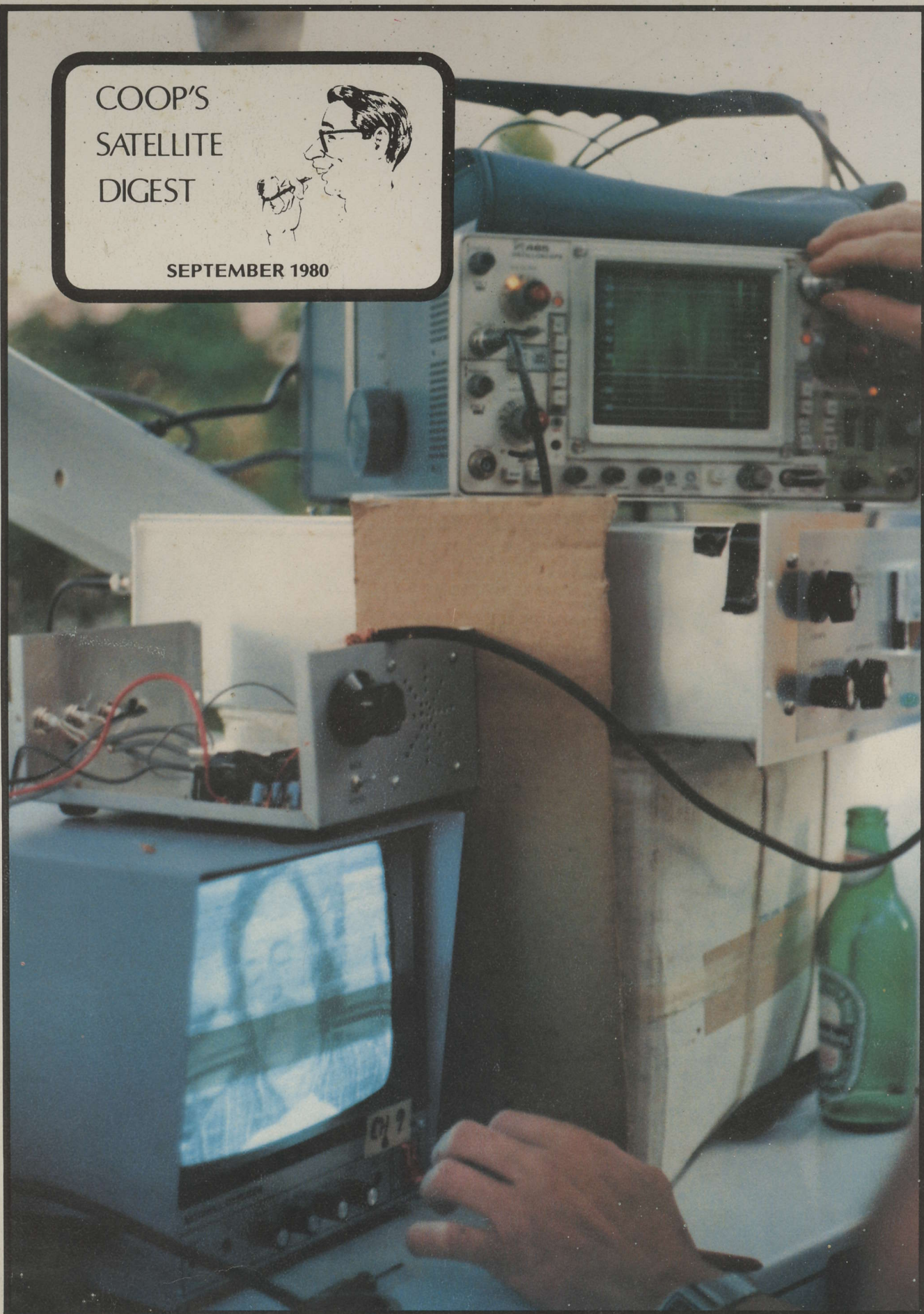


COOP'S  
SATELLITE  
DIGEST

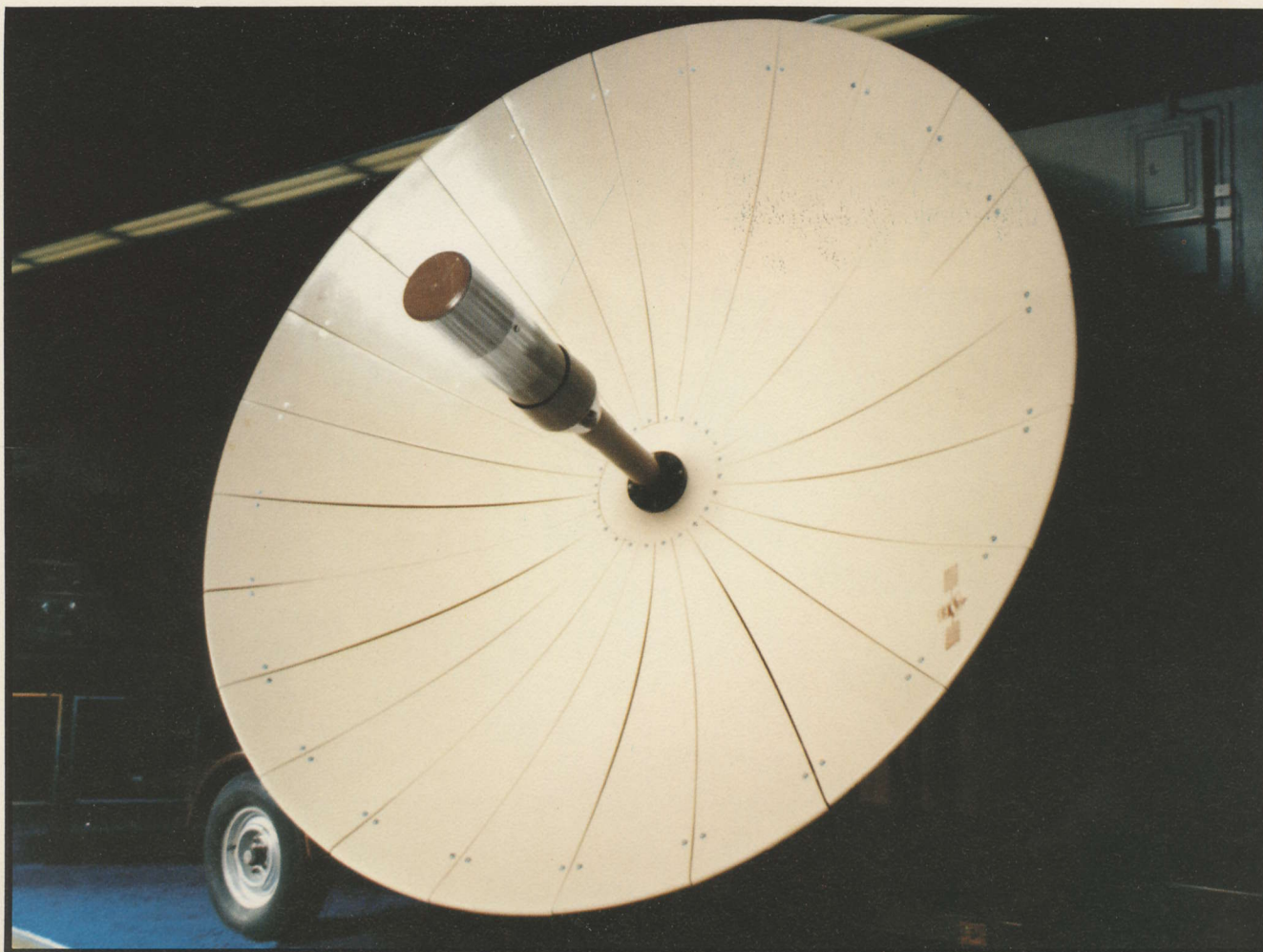


SEPTEMBER 1980





# LET'S TALK PRICE AND PERFORMANCE -



## Manufacturer to Dealer/Distributor.

Becoming a 'dealer' in home TVRO terminals seems pretty simple. All it takes is several thousand dollars of your money to buy a trailer mounted portable rig. Unfortunately that's where many of the suppliers stop treating you like a dealer; they take your money, deliver to you a trailer equipped with antenna, feed, receiver, LNA and some cables and they send you off down the road. **STS of Missouri** believes there are enough 'wrinkles' to this new business to require more of an effort than that. And that is why we go the extra mile to get a dealer really up and running. **We train you.** Not in just how to make the trailer rig play, but in the fine points of showing off various satellites, what to emphasize **and** what to avoid (!). We know from experience 'how to sell' home terminals. We teach you this because we feel you don't really become a dealer **until you start selling** systems to others. And that brings us to pricing. There are plenty of trailer mounted rigs around and you can spend \$7500 or more to get started as a dealer. We believe the trailer rig needs to be priced low enough that **you can afford** to become a dealer. That's why we price our complete 10' high quality trailer rig thousands of dollars below what some others sell for. The trailer rig is like a camera...with it **you will sell** dozens or even hundreds of complete systems. And just as the camera owner keeps coming back for film, you will keep coming back to **STS of Missouri** for complete home terminal packages. It is just as simple as that...we are 'bottom line' conscious; **your bottom line** because we know the name of the game is profit for you. All **STS of Missouri** home systems (from our 10 foot panelized antenna system that breaks the 'bird-bath-looks' barrier to our big, rugged 13 foot solid dishes) are quality; from the ground up. And while we provide **complete** systems (including modulator, all cables and fittings; ready for you to install and hook up directly to the user's TV without any 'funny part' hassles), at **STS of Missouri** you can also buy just the parts you need! REMEMBER - your future as a dealer will only be as good as the integrity and strength of your manufacturer. **STS of Missouri** has the 'winning combination' of good looking antennas plus completely packaged home receiving systems that bring a new dimension to quality; reasonable pricing. So join up today with 'The Good Looking Team' at **STS of Missouri** where as a dealer you get far more than a trailer mounted antenna and a hearty handshake.

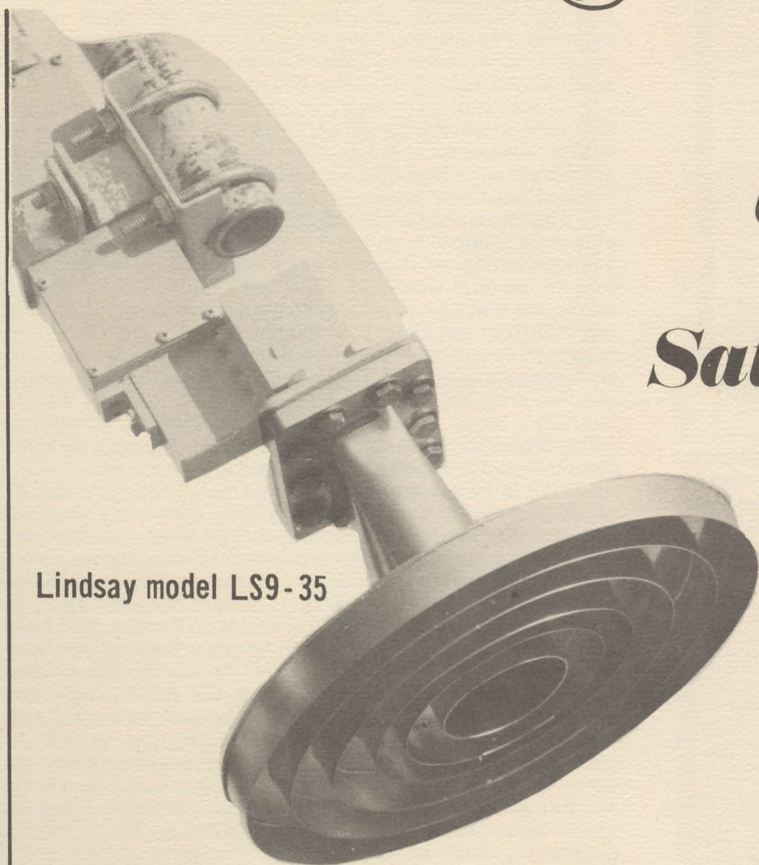
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## COOP'S COMMENT ON TECHNOLOGY

### SURPRISE - Houston Is On!

Immediately after we got home from San Jose I sent out a letter to all of the 30+ equipment exhibitors who appeared at San Jose asking for their thoughts on what we did right and wrong there and how we could make future seminars more enjoyable for them. We also asked them to help us plan when the next seminar should be held and gave them several alternatives which we had been considering. Frankly we were tired and felt that after they got home and got off the 'high' of selling out wall to wall their entire production for the next several months (at San Jose) they'd want to catch their breath as well.

**Well surprise.** With 70% of the exhibitors commenting in ten days time there were fewer than 15% who said they didn't want to have another seminar **this fall!** Apparently seminars get into your blood stream and just won't let go. I know they are fun (for most people) but I honestly felt three per year was pushing it. "Not so" said several exhibitors "by scheduling them about four months apart you are pushing us to keep coming up with newer technology and new efficiencies...and we think this is good!"

OK. The dates are November 17, 18 and 19. The location is **The Adam's Mark Houston hotel**, a facility that is not even yet open (it is that brand new!). There is 15,000 square feet of exhibit space, a super new facility with tennis courts, saunas, what is called the best eating restaurant group in the southwest about a block away and a brand new MATV system (those who were in San Jose will appreciate that).

There are some changes. We are calling this fall gathering the '**Satellite Business Opportunities Conference**'. And we are changing the format slightly because one solid message I got from San Jose is that more and more people coming to these gatherings are there primarily because they want to get into business, in satellites, in some fashion. OK - I promise we are not going to ignore technology at SBOC (there is no way to ignore it or even discount it since this is what is making us all move so fast) but the emphasis is going to be on entering the satellite systems business at some level and making a living at

it. There will be big emphasis, in our live lectures, on being a dealer or distributor in this field. Everything from employee training to trouble shooting customer terminals will be included. We will also have sessions on uplink terminals, how you can make money with them, and even programming on the satellite and making money as a program original source.

There will be plenty of exciting new technology for everyone; even newer receivers, possibly an Umbrella antenna with a receiver and LNA built in (!), a new 150 pound 10 foot antenna-mount-feed that can be shipped UPS, and much more I will tell you about as we get closer to the November dates.

**I am convinced we are on the verge of mass merchandising of private satellite terminals.** Very-very close. I have Watkins Johnson telling me that by November first they will be able to deliver several thousand VTOs per month. I have Bob Luly telling me that he will be able to deliver hundreds of antennas per month in the Umbrella fashion by then. I am starting to hear rumbles about another LNA price drop. There are lots of smoke signals out there and with the fantastic growth of satellite programming services now taking place in the cable industry, those firms out selling systems to commercial establishments such as motels, hotels, clubs, apartment complexes and the like should be having a field day.

Now let me assure all of our loyal SPTS fans that SBOC is not a sign that we are changing the rules here. **Quite the contrary** - the innovation that we get at an SPTS plus the one on one exchanges between technical innovators is I believe one of the primary reasons this industry is growing and developing so rapidly. What I am trying to do is to split the year up so that each spring (starting in 1981) in say the Chicago area in late March or early April (right after it finally warms up) we'll have a 'regular' SPTS event. Then over the 4th of July weekend (sorry Tay!) an annual west coast 'regular' SPTS event. Come the fall, in Houston if we like what happens there this fall, a 'modified' SPTS event under the flag of a business opportunities conference. This will allow us to broaden out a little, move in on the areas we have neglected to date (including cooperative programming ventures and low cost uplinking for some of the smaller nations of the world) and generally put the same talents who have revolutionized low cost receiving terminals to work solving some of the other 'expensive areas' now slowing down satellite growth world wide. I can see a \$25,000 portable uplink terminal on our horizon...if I can just get some people like Taylor Howard and Robert Luly pointed in that direction. **SBOC '80 will be a start in this direction** and to that end I invite you to attend. **Registration card appears in this issue!**

### OUR COVER

The 'San Jose' SPTS story in a picture. Moscow on TV, a make-shift table piled high with equipment rounded up from exhibitors and participants and an empty bottle of European refreshment. A clever Californian decided to see if he could use a 'scope filter to catch and drag out the 3.5 microsecond Molniya PWM audio; sure enough there it was with program audio!

CSD  
TECHNOLOGY



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## WRAPPING UP SOME LOOSE ENDS

### TIE IT ALL TOGETHER

We left several loose ends dangling in our July CSD report on Molniya as well as our brief mention in the August SPTS San Jose report concerning an apparent problem with the Sat-Tec R2 receiver. Given the period at the end of July to get back down to some lab work we can now sort all of this out and put to rest some rumors about both the R2 receiver and the Molniya audio recovery problems.

As readers and viewers of our STT videotape ('They Call This Bird Molniya') are aware, we conducted most of our serious work on Molniya utilizing a prototype Sat-Tec receiver. Our unit may well have been the first production unit to leave the factory, and we anticipated some changes and perhaps even problems since one only learns by doing the same thing over and over again. Our July issue report on the R2 said we found the receiver to have as much video sensitivity (on Domsat signals) as a well known \$7,000 radio although we found the audio sensitivity on the more expensive unit somewhat better. In answer to queries the \$7,000 receiver is the Microdyne Model 1100 TVR (VT); an older model no longer in production but very popular with the early CATV system users back some four or five years ago. Our unit is serial number 48 and it has given us good service for more than three years now.

August issue readers noted that we had found a baseband noise problem with the R2 receiver which we had overlooked previously; actually Steve Birkill was the first to spot it while here in mid-July and we were jointly hooking up his latest version of the Pulse Width Modulation detector system to try to recover Molniya PWM audio.

Our first inclination, spotting that the video information coming out of the R2 was badly tilted towards the chroma end (high end) of the baseband passband, was to call John Ramsey for help. John did not act too surprised and in fact commented that this was one of the choices a designer had to make when he got the user price down under \$1,000, and, was also married to a PLL type detector. He suggested he would send us a 'fix' however. And within days a small package arrived with a single IC device tacked on a board with about two dozen other parts.

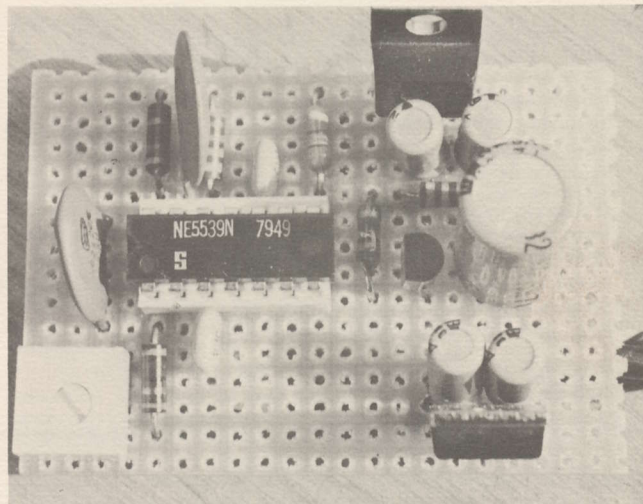
At this point we decided to trot the Microdyne 1100 TVR (VT) and a Microwave Associates VR4 (another \$7,000 receiver) out to the Molniya test station. We figured that neither of these expensive receivers would have any trouble with baseband noise and that we ought to be able to 'grab' or 'gate' out the PWM pulses from their video output with ease; using the newest version of the Birkill PWM demod. So a day of testing and comparing ensued; with the 11 foot ADM dish equipped with a Birkill right hand circular feed and a 100 degree LNA, we wired up first one receiver and then another.

The results were disappointing. Those who saw the San Jose reception of Molniya may recall that utilizing an ICM 4300 or a Sat-Tec R2 receiver the picture was virtually identical to the eye; some grain appearing and depending on where you had the variable tuning set either black sparklies or white sparklies. We also saw in San Jose that the AVCOM PSR-3

receiver produced the picture with the **least** amount of sparklies but the picture had horizontal streaking in it. You sort of decided whether more sparklies and **no** streaks, or streaks and **less** sparklies was your preference. (Interestingly enough virtually everyone there opted for the 'less sparklies with horizontal streaks picture!').

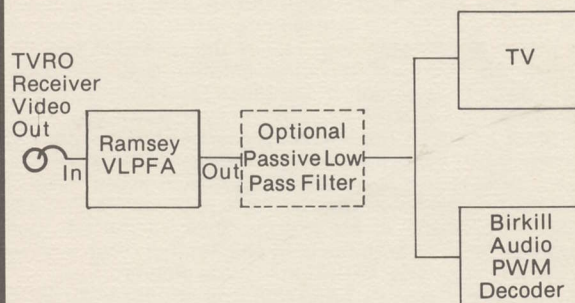
The 1100 TVR(VT) and the VR4 looked like the PSR-3. That is, less sparklies than the R2 but horizontal streaking. And between the pair of \$7,000 receivers the 1100-TV(RVT) had fewer horizontal streaks. Our April issue talked to the matter of the horizontal streaks and it might be a good idea to re-visit this subject briefly again now that Molniya watching is fashionable.

The Russian SECAM color system uses a line-rate rather than our NTSC one-per-field phase identification system. Our more expensive receivers use a 30 Hz energy dispersal clamp that acts on the back porch portion of the video signal. In the Russian waveform we have a pair of audio pulses which are not found in the American (NTSC) signals. The second of these pulses can (and will) fool the clamp; it looks like a part of the back porch signal to the clamp. When you tune in Molniya which combines SECAM color with the PWM pulses on such a receiver the presence of the second (last in time) PWM pulse 'modulates' the clamp and produces horizontal streaking in the picture. The irony of all of this is that the Russians do not even bother to have 30 Hz energy dispersal dithering on Molniya since they are not concerned about interfering with terrestrial



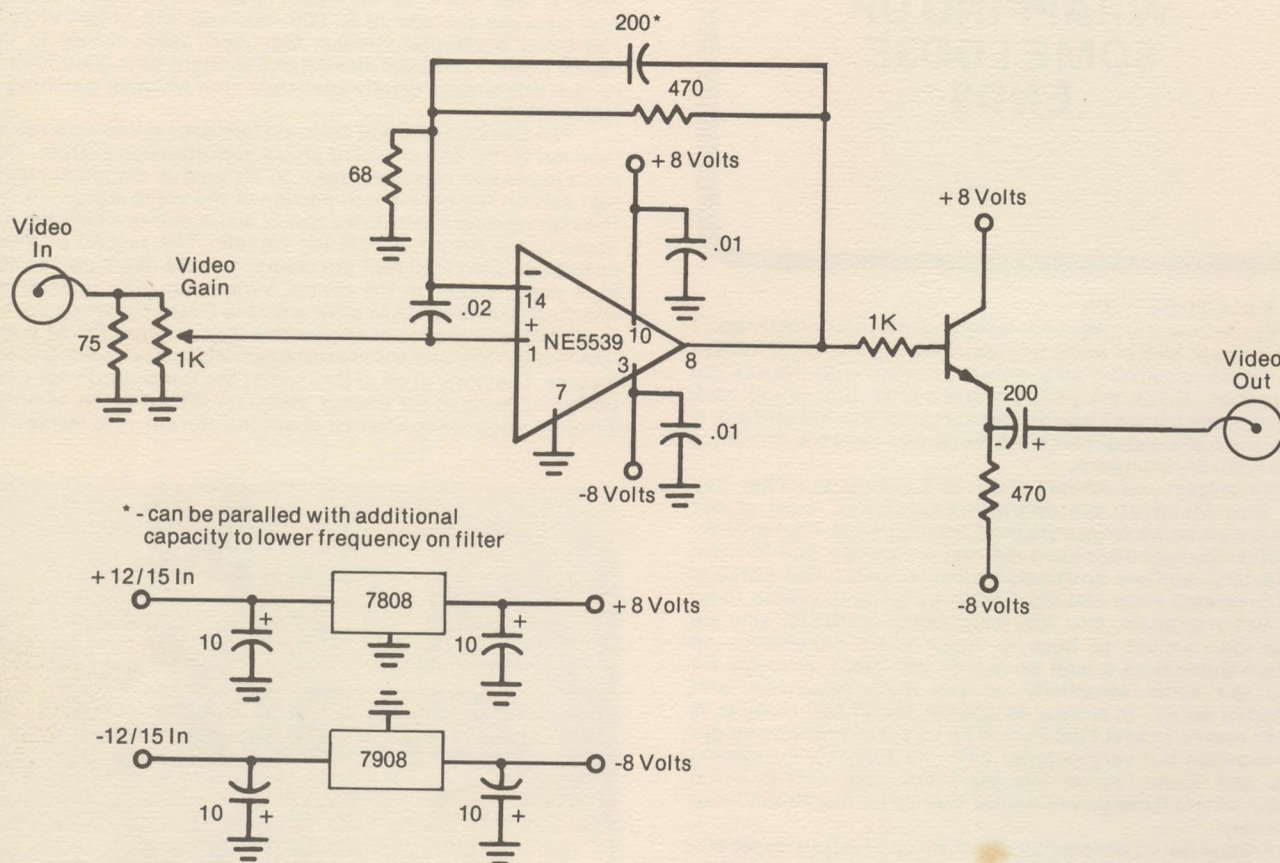
RAMSEY'S VLPFA DEVICE - Signetics NE 5539N high speed op amp; input gain control at left.

### HOW TO USE RAMSEY VLPFA





## RAMSEY VIDEO LOW PASS FILTER AMPLIFIER [VLPFA]



microwave systems in the first place! But the receivers built for our standard do have the clamp built in and the unusual PWM pulse system triggers it causing the streaking.

**One solution** to this problem is to dis-able the 30 Hz clamp circuit in a high dollar commercial receiver. This is usually more complicated than it sounds however since a clamp by-pass system has to be added to the receiver and it may not be worth modifying a high dollar commercial receiver for this purpose for the occasional look at Molniya. **There are two other solutions.** One is to forget the Russian sync and blanking signals altogether and create and re-insert at the receiver totally new sync and blanking. This is the approach taken by Steve Birkill in England. The other solution is to clamp on a different part of the signal; the original Tay Howard receiver (as detailed in his Manual) clamps on sync pulse tips with a simple diode and capacitor that simply carries the 30 Hz energy to ground. It turns out that most of the home/private design receivers constructed subsequent to the Howard receiver Manual publication have followed Tay's approach to clamping the (usually present) 30 Hz energy. Back to the San Jose Molniya reception on both the ICM and Sat-Tec receivers; you didn't see any horizontal streaking in those pictures.

**But you did see some grain** that was not apparent in the AVCOM receiver. And since most people seem to object first to grain (noise) and second to streaking (modulation of the clamp by the PWM second pulse) perhaps a better ultimate solution would be to clean up the noise!

Well, finding that we were not really getting ahead by

tying the Birkill PWM decoder to the 1100-TVR (VT) or to the VR4 we were anxious to see what John Ramsey's 'fix' might be. It is shown here in schematic form. As you can see, it installs after the output of the R2 receiver; between the receiver and your monitor (or RF re-modulator). John calls it a 'Video Low Pass Filter Amplifier'. The major single active device is a signetics NE5539 high speed OP amp.

Tired of having sixteen trillion patch cables and clips leads laying out over the work bench during Molniya reception we installed both the Ramsey 'VLPFA' and the Birkill PWM decoder into a suitable Bud box housing with a hefty power supply. The Birkill PWM decoder as shown requires a well regulated 12 volts (positive) while the Ramsey 'VLPFA' has to have + and - 12 volts; and regulation doesn't hurt anything. Internally in the 'VLPFA' John has 8 volt regulators for + and - 8 volts to the NE5539.

Along the panel of the Bud box we installed a set of jacks so that we could do quick switching between [1] feeding a TVRO video input directly to the Birkill PWM decoder, or, [2] feeding a TVRO video input directly to the 'VLPFA', and then by quick connect cables either route directly to a monitor or to the PWM decoder after the 'VLPFA'. In this way we could insert any segment of the pair of gadgets alone or any combination of the two (with an external video lowpass - passive - filter which is detailed on page 41 of the Washburn Manual). Here are the results of all of this:

1) VR4 receiver 'barefoot' (i.e. alone) - Molniya reception had a minimum of sparklie noise and the 1 MHz tuning





MOLNIYA on barefoot R2 receiver

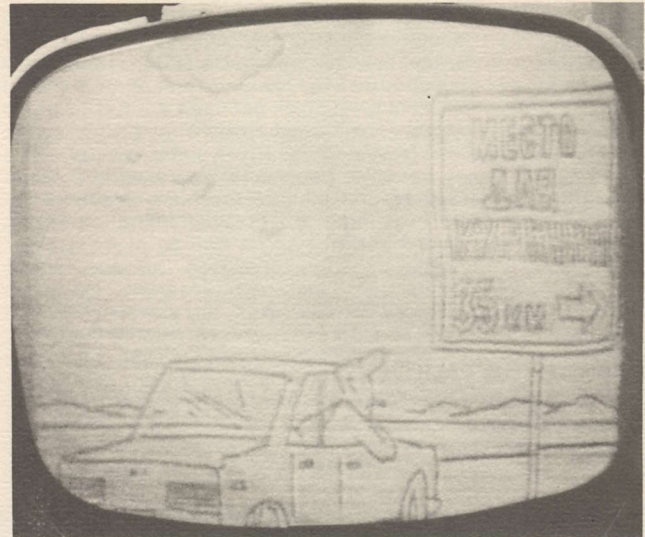
steps possible with the VR4 make it easy to get right on the 3875 MHz center frequency. The clamp modulates badly with the Russian audio pulse however and horizontal streaking is intolerable. Audio recovery with the Birkill unit fed directly remains noisy.

2) 1100-TV[RVT] 'barefoot' - Molniya reception had slightly less sparklie noise than with VR4 and far less horizontal banding. However horizontal banding was still objectionable. Molniya audio about the same as with VR4 (noisy) when fed directly into Birkill PWM decoder. By feeding receiver video into 'VLPFA' and then feeding Birkill PWM decoder, horizontal streaks improved slightly and audio improved slightly. Picture still not good quality and audio would be difficult to understand even if you speak Russian.

3) R2 receiver 'barefoot' - Molniya reception had objectionable noise content and audio could be barely found (i.e. detected). This was the problem mentioned in the August CSD notation that led us to go back to John Ramsey in the first place. Running the video output into the Ramsey supplied 'VLPFA' made a **dramatic difference** in the picture quality (see photos here). Picture quality was equivalent or better than best quality Microdyne reception. The audio system produced the 'best'



MOLNIYA on barefoot R2 receiver



MOLNIYA AFTER VLPFA processing through R2 receiver

'audio' we have heard from Molniya although to be totally fair it remains noisy and is not pleasing to listen to. But, a person who speaks Russian can understand what is being said and having audio that matches the video increases the Molniya reception enjoyment by perhaps 100%.

The improvement of the R2 receiver with the 'VLPFA' in the line is difficult to describe without sounding like we are hyping the performance noted. Let's just say that we will **never** use our R2 receiver again (even on domestic signals) unless we are running the output through the 'VLPFA'. We would urge anyone who has an R2 or is thinking about getting one to do likewise; you can build up the 'VLPFA' from the schematic shown here and while we mounted our board in an external case because of our patch-cable considerations, it could be installed internally in the R2 if you could figure out a way to get both positive **and** negative voltage for it from the positive-only power supply in the R2.

Since this is the last time we **expect** to visit the Molniya reception situation in any detail there are some additional observations which are worth passing along. You must keep in mind that Molniya video is not directly compatible to US NTSC video; you already know that your vertical height adjustment must be re-adjusted downward to bring the picture (which is



MOLNIYA AFTER VLPFA processing through R2 receiver



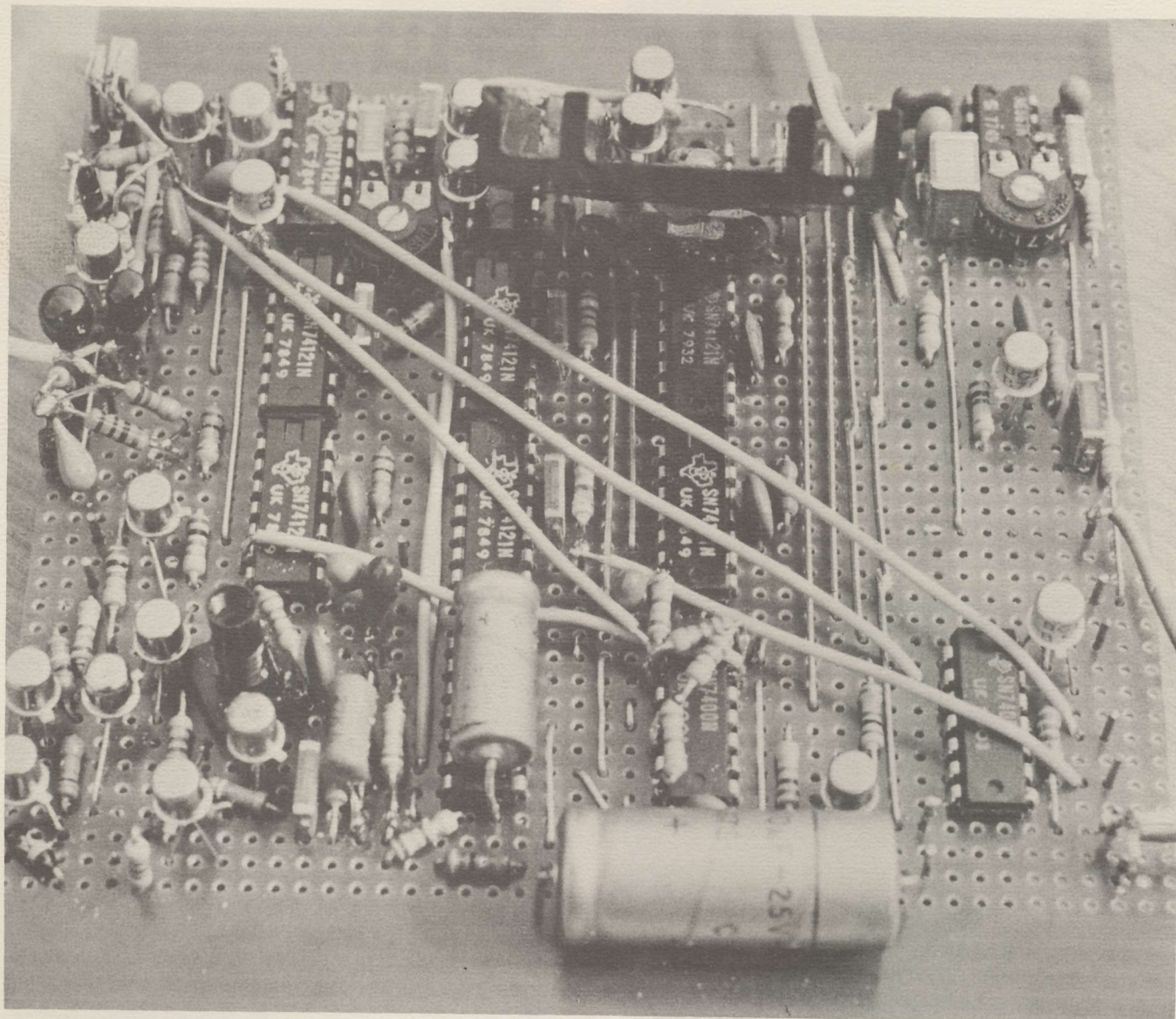
17% 'taller') down onto an NTSC screen. The 50 Hz derived sync signals with Molniya (and the new Ghorizont bird detailed elsewhere in this issue) are 'strange' to the NTSC monitor and the presence of the two extra Molniya audio pulses (plus a third pulse that reaches white level stuck **between** the two Molniya audio pulses for some unexplained reason) in the horizontal blanking interval can trigger instability in some monitors. The word **'some'** is key here; we happen to have around a dozen straight video monitors and monitor-receivers available for trial and we found by simple process of elimination that a Setchell Carlson model 10M915 and a Conrac model CVB17 (both black and white) monitors produced the most stable pictures out of our collection of monitors. (We even tried to run the Molniya video into a Sony KP-5000 big screen TV which considering that big screen TV is a 'western' phenomenon may have been the first big screen display of Russian TV in the history of mankind!) Some (GBC, etc.) black and white monitors produce **absolutely terrible** Molniya video; they just cannot handle the extra signals or the fairly wide baseband (video) bandwidths. Bottom line? Be prepared to do some monitor swapping with Molniya. You too will be amazed at

what a difference the right 'monitor' makes.

Numerous people have taken the demodulated video out of their TVRO receiver and run it into their Betamax or VHS recorders. You cannot **record** directly Molniya video but you can use the modulator built into a recorder to get you back on a NTSC RF channel. We tried it on various VHS and BETA machines and found they all worked pretty much the same; i.e. OK. If you happen to be working with the new Ghorizont bird which has standard audio subcarriers you can carry the audio along with you too.

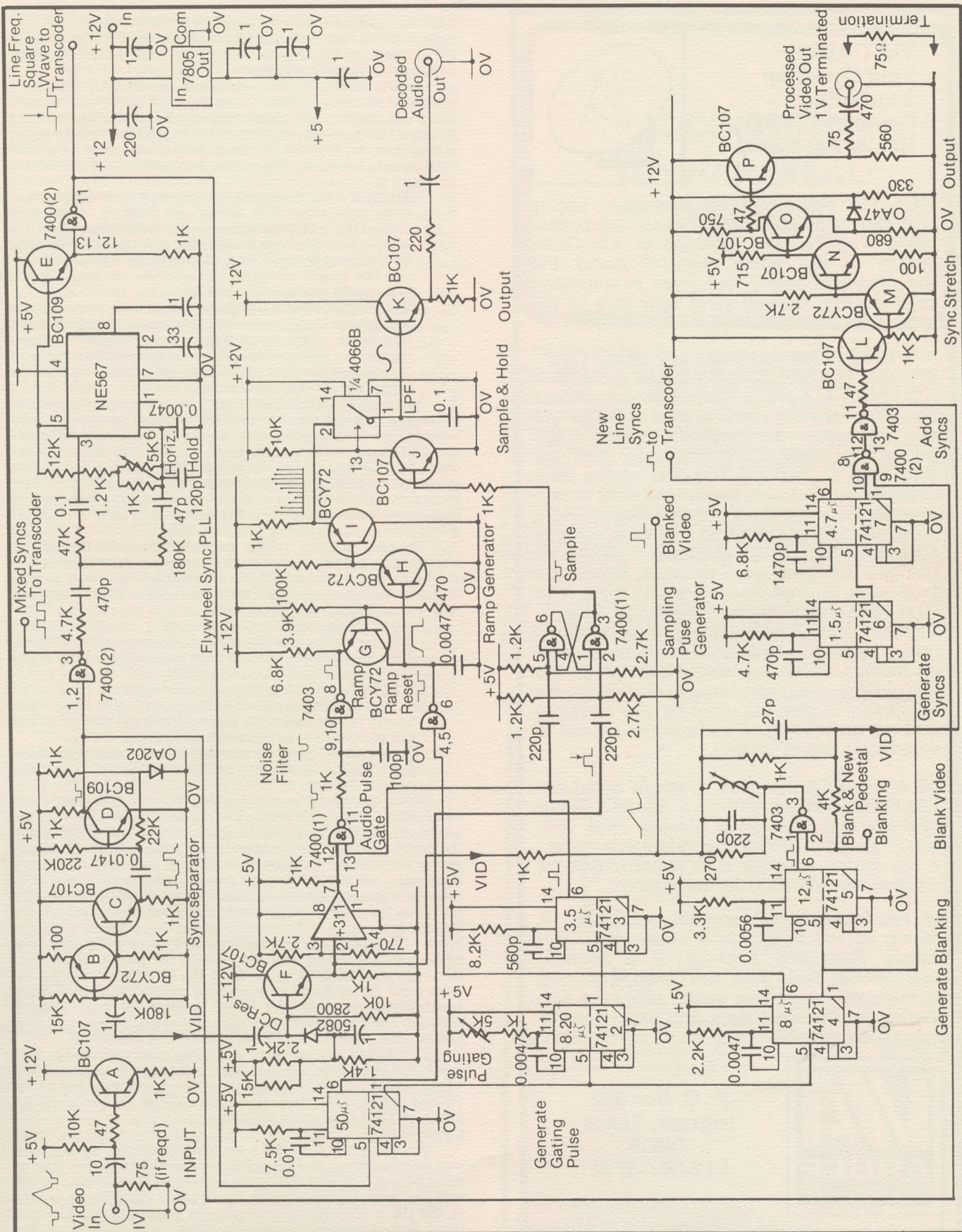
#### Birkill PWM Decoder

We have reached the conclusion, after testing and talking with Steve Birkill at some length about the problem, that recovering high quality Molniya PWM audio **can be done** utilizing the new circuit shown here. This is the unit Birkill built up for us late in June, shipped over to us and then worked with us while in Oklahoma in mid-July. **BUT** - recovering **good quality** PWM audio requires far more signal (RF at 4 GHz) than we could get out of the sky with an 11 foot dish. Extrapolating our own audio signal to noise ratio and our video CNR ahead to the point where we could reasonably expect totally noise free



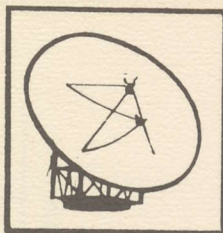
**BIRKILL LATEST VERSION OF PWM AUDIO decoder system per schematic diagram here. We found the 1 volt P-T-P input adjustment requirement critical and by balancing gain control on Ramsey VLPFA and 500 ohm pot across input line to Birkill decoder we were able to clear out most of the background noise and sync pops.**







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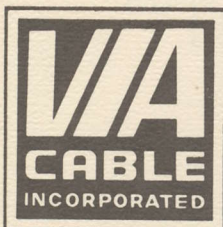


QUALITY home terminal packaging begins with the selection of high quality component parts. The TEXSAT Division of Via Cable brings to the home terminal world the experience of nearly five years in supplying high quality, cost-effective terminals to the cable television industry.

**NO TWO home terminals are alike.** That's why our TEXSAT Division stocks in depth a full line of 3, 4 and 5 meter fiberglass dishes including mounts, rotating feed systems and for the super sophisticated system dual-button hook feeds with orthocoupler. AND we also stock in depth a full line of the best components and hardware in the field today; devices and units field proven through years of satisfactory use by cable television systems coast-to-coast. FOR example - TEXSAT carries 120 degree Avantek LNAs, Microdyne 24 channel tuneable receivers (and there is no finer receiver available in the world today!), Blonder Tongue professional grade modulators, Heliac® and 214 cable sets and connectors. AND we also stock handsome customized cabinets for all of the inside equipment to give the ultimate user a system that not only works to state-of-the-art but is pleasing to look at as well!

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**IF** low-grade home terminal equipment is eating up your profits as a dealer, or if you simply want the back-up of a trained, professional staff that has been installing terminals for over five years, check us out. We've got the equipment and experience to make you profitable!



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78025  
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video and audio we feel that anyplace in North America you will require a **16 foot dish** equipped with a right hand circular (RHC) feed and 120 degree Kelvin LNA to get noise free video and audio under all conditions.

Additional Molniya observations tell us that there is a signal variation of perhaps 1 to as much as 2 dB from the bird while it is operational. Most observers seem to agree that the strongest signals are typically when the bird is either going into apogee, or, towards the end of the active period when it is coming out of apogee. There are two possible explanations for this:

- 1) **The bird is closer to most of us** when it is first turned on, and, just before it is turned off. That is, when it is closest to the US/Canadian border rather than when it is over Mansel Island at apogee (See **Coop's Satellite Operations Manual** from STT). The closer it is to us, the less the 'space' or 'path' loss and this can amount to a part of a dB anyhow.
- 2) **The bird's Global beam pattern** may have some ripples or ridges in it. We have noticed however that each of the four birds in the 'train' follow pretty much the same pattern for signal strength (although recently the bird switching on around 2300 GMT does seem to be perhaps a dB stronger than the other 3).

The slight 1 to 2 dB difference in video signal quality is measureable but not really noticeable unless you have a very marginal system to begin with. However - you can really tell the difference in the audio quality when the carrier level changes by perhaps 2 dB. Those 3.5 microsecond pulses which you have to 'gate' out of the horizontal blanking interval and recover for demodulation to audio are tricky little fellows that do not like noise of any kind. There seems to be a 'threshold' effect here just as you have with FM video.

The new (and we 'stamp' suitable) Birkill PWM decoder shown here is a later version of the system described in the April and May issues of **CSD**. To understand the theory behind this circuit we refer you back to those issues of **CSD**. There are only four builder-user adjustments:

- 1) **Input voltage level** (video) must be 1 volt. We placed a 500 ohm pot across the receiver video line to the PWM decoder and adjusted this level for best sounding audio (very-very close to 1 volt typically).
- 2) A **SECAM 4.43 MHz color sub-carrier trap**.
- 3) A **pulse-gating window control** (pot) with which you search for the optimum placement of the gate atop the 3.5 microsecond pulse carrying the audio.
- 4) A **'horizontal hold'** control which is adjusted for maximum horizontal stability on the video picture (just like on your TV set).

Some observations about using this circuit. The more noise you have in your video, the harder it will be to recover adequate audio. And the tougher it will be to properly 'balance' the (1) input voltage level adjustment, (2) pulse-gating window pot. You do have to work back and forth very carefully. At the same time you should have the TVRO receiver adjusted for an equal balance between black and white sparklies (assuming you are not totally out of the noise). To **initially** set it up, run the video level pot down (**below** 1 volt) to about .75 volt, tune the receiver ever-so-slightly into the white-sparklie region and then adjust the gate-window pot. Once you start hearing audio bring the video level up slightly (to around .85 volt) and re-adjust the gate-window pot. After peaking that re-adjust the TVRO receiver for best balance between black and white sparklies and bring the level up to a full volt readjusting the gate-window pot one more time.

The Birkill gadget does work very well but again this caution; if your video is not at least to the quality you see here in our photos, you are wasting your time going after the audio (unless you just want to see if you can do it) as the audio will be noisy and not pleasant to listen to.

#### Conclusion

Watching the Russian / Moscow Olympics on Molniya was quite exciting. Seeing the events on Russian TV a day or more **before** film footage of the same events reached the US was intriguing and comparing the Russian video of the events to the US or Canadian coverage was educational to say the least. Future Molniya reception will be just as exciting for



those who have never previously watched Russian television but for those who have now done it there will be new challenges in the sky to conquer!

Finally this observation for those who might build up the Birkill PWM decoder as shown in this issue. We took the opportunity while Molniya was on test pattern to carefully adjust the PWM gating pot as well as the 1 volt video input level (which must be precisely set). We found it much easier to adjust to the Russian 3 Kc audio test tone than we did to adjust to programming since programming audio levels vary widely. We had the neatest sounding 3 Kc test tone you could imagine; it was loud and clear from 50 feet away. We also took this opportunity to check the PWM audio tone pulse on the scope and sure enough there on the first vertical trace was the 3 Kc (or KHz if you are not old fashioned!) trapezoid pattern. The second (to the right) pulse was a straight line; no audio present.

Then when programming started we cranked up the volume...and there was nothing there! Just sync buzz garbage. Back to the scope and sure enough the Russians had switched PWM channels on us! Subsequent checks revealed that this is apparently standard practice; **run a test tone on the first pulse** when the test pattern is up but carry **program audio on the second** (furthest right if you see it hanging along the right hand edge of your TV screen) PWM channel. In our system the Russian audio on the first pulse is **far cleaner** than on the second pulse; but to date on this pulse we have heard **only** the 3 Kc test tone and just prior to shut down what we believe are Russian Orbita ground station instructions from Molniya control advising the ground terminal operators that a switch is coming up.

#### MOLNIYA ORBIT TIMES

Based upon observations at the first of August the Molniya birds continue to make a complete trip around the earth in approximately 23 hours 55 minutes and 40 seconds. This means they continue to 'slip' approximately 4 minutes and 20 seconds per day; apogee one day will be 4 minutes and 20 seconds **later** than it was **the day before**. Late July measurements also indicate that Molniya orbits have begun to drift **to the west** (i.e. apogee is occurring as much as 3 degrees further west in late July than it was in mid-June). Detailed instructions for tracking and plotting Molniya are found on pages 42 to 49 in **Coop's Satellite Operations Manual** and on the **'They Call This Bird Molniya'** videotape from STT.

To update the tracking times to the month of September, here are the projected turn-on, turn off and apogee cross over (i.e. shift from south / north to west / east trajectory) times. The numbers given here are in GMT (Greenwich Mean Time) which is eastern daylight plus four hours (etc.) and the times given are the projections for September 15, 1980. To calculate days either side of September 15th add 4 minutes and 20 seconds per day for each day prior to the 15th you are looking, subtract 4 minutes and 20 seconds for each day after September 15th you are looking. **CSD** is looking for **your own** observations as feedback with special interest in exact turn-on, turn-off times with the date of observation.

#### Projected 9-15-80 Operating Parameters [GMT]

	#1	#2	#3	#4
Turn On	0701	1219	1837	0025
Turn Off	1219	1838	0025	0701
Apogee	0847	1325	2034	0230

If your TVRO installation(s) is equipped with a **Chaparral** scalar loaded feed horn system and you would like to **add 2 to 3 dB** to your received signal power when tuning in right hand circular polarized signals (Molniya, Ghorizont, INTELSAT) here is a clever trick worked out by Taylor Howard which may well be the least inexpensive 2 + dB you can add to your system.

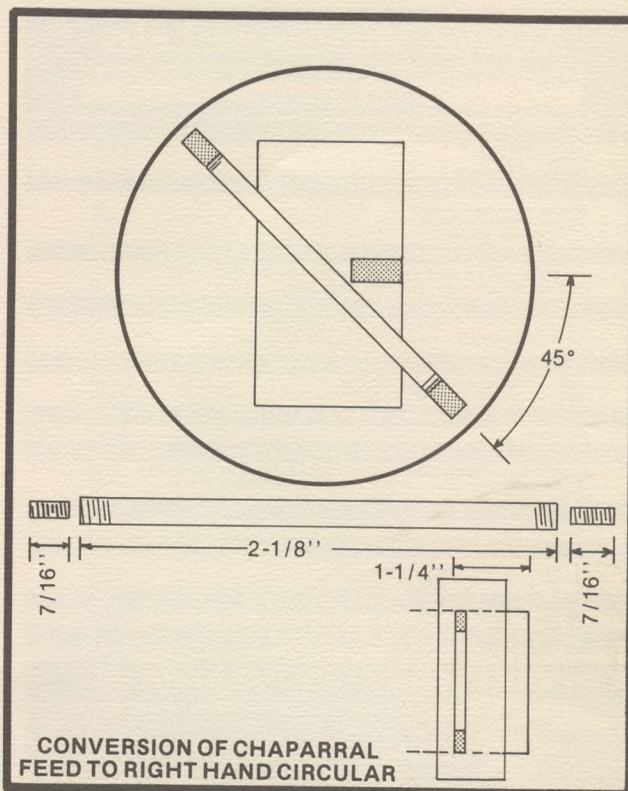
We calculate the cost to be less than 50 cents; possibly totally free if you have a used BIC pen laying around on your desk and can scare up some 3/16" diameter aluminum or brass rod (such as welding rod). No, **steel will not do!**

The instructions are almost too simple. Your present LNA

## ADDING RHC TO CHAPARRAL FEEDS

has a linear feed probe, or, your present (tubular) feed has a linear probe pin. You rotate that probe pin to a vertical position when you want vertical polarized reception and to a horizontal position when you want horizontal reception. Right hand circular polarization, as employed almost universally outside of North America, can be received on a linear probe but in doing so your probe only intercepts a portion (roughly 50%) of the right hand (circular) polarized signal wave front. The Birkill feed widely described in **CSD** and other STT literature allows you to select by alignment of a set of pins inserted into the feed system in front of the actual pickup probe either right hand circular, or left hand circular, vertical or horizontal polarized signals. These pins inserted into the waveguide chamber between the front or lip of the feed and the actual feed probe disrupt the flow of RF energy along the inside of the waveguide leading to the probe. By carefully adjusting how **long** the pins are and **where** they are inserted in the waveguide you can disrupt the right hand circular wave front so that it, for example, becomes a linear polarized signal.

After getting all wrapped up in Molniya reception Tay Howard decided to see if he could get that last 2 to 3 dB from





## TVRO SYSTEMS

**SYSTEM I** - Prodelin 15' Antenna — Microwave Assoc. VR-4X Receiver, Two Avantek 4215 LNA's, Video Tape Recorder/Modulator, Cables.  
Dealer Cost .....\$13,950.00

**SYSTEM II** - Prodelin 12' Antenna — remaining equipment same as System I.  
Dealer Cost .....\$12,700.00

**SYSTEM III** - Prodelin 10' Antenna — remaining equipment same as System I.  
Dealer Cost .....\$9,990.00

**SYSTEM IV** - Microwave Assoc. VR-3XT Receiver, Prodelin 10' Antenna, one Avantek 4215 LNA, Modulator, Cables.  
Dealer Cost .....\$6,995.00

**SYSTEM V** - SAT-TEC R-1 Receiver, Prodelin 10' Antenna, one Avantek 4215 LNA, Modulator, Cables.  
Dealer Cost .....\$4,995.00

Prices net and do not include freight or tax if applicable.  
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(907) 338-0340

### TRANSISTORS

MRF901 F14.5GHZ	\$3.00
BFR90 FT5.0GHZ	\$3.00
NEC 02137 FT4.5GHZ	\$3.25

### HOT CARRIER DIODES

MBD101 UHF—MICROWAVE	\$1.50
ND4131 4GHZ NF—5.75 DB	\$19.00
4GHZ NF— 6.5 DB	\$2.00

### CHIP CAPACITORS

1.2 2.2 3.3 4.7 6.8 10 18 22 27 47 100 120 180 220 270 330 390	
470 560 680 820 1000 1200 1800 3900 8200	\$ .60

### RF - IF I.C.

MWA—110	.1 TO 400 MC 14 DB GAIN TYP	
RF—IF AMPLIFIER I.C.	3 TERMINAL IN, OUT, & GROUND	\$7.95

### GaAs FETS

MGF 1400 NF 2.0DB AT 4GHZ MAG 18DB	\$28.50
MGF 1412 NF.8DB AT 4GHZ MAG 18DB	\$75.00

### DUAL GATE MOSFET

RCA 40673	\$1.50
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### COAX CONNECTORS

SMA CHASSIS MOUNT SQUARE FLANGE	\$5.90	TYPE N CHASSIS MOUNT SQUARE FLANGE	\$3.20
SMA PLUG FOR RG—58	\$6.57	TYPE N PLUG FOR RG—58/RG—8	\$3.69
SMA PLUG FOR RG—174	\$6.57		

### FEED-THRU CAPACITORS

500 PF	\$ .50
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### TEFLON CIRCUIT BOARD

APPROX. 3.5" x 5.0" x .010	\$5.50
APPROX. 3.5" x 5.0" x .0312	\$6.50

### CHIP RESISTORS

50 OHM WATT	\$1.50
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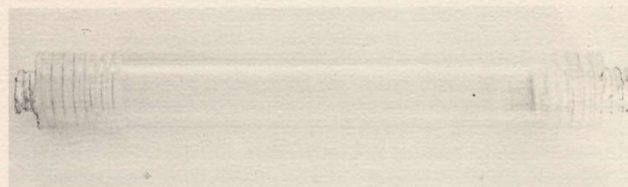
### PISTON TRIMMERS

Triko 201—01M.5—3PF( )1—9PF( )	\$2.50
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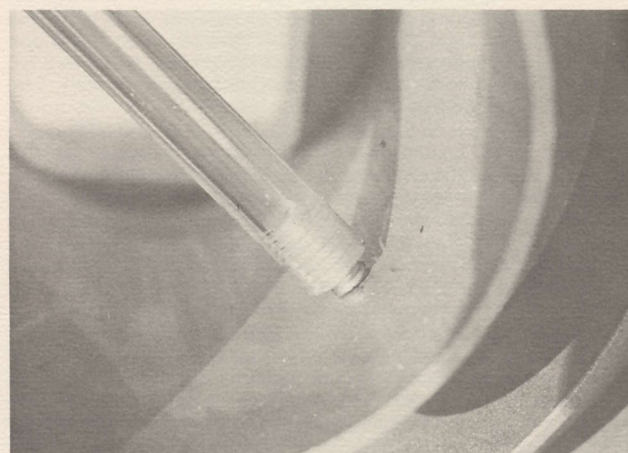
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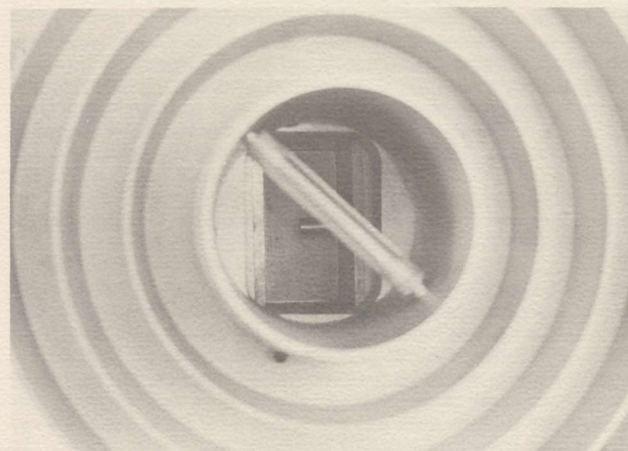
IF YOU DO NOT SEE  
WHAT YOU WANT ASK



RHC FOR CHAPARRAL feed - starts from salvaged Bic Pen!



RHC POLARIZER installed in mouth of Chaparral feed



WEDGE threaded rods [two ends] into position 1.25" back from mouth of Chaparral feed as shown in diagram.

Molnaya's RHC without a lot of fuss and bother. Being a microwave engineer didn't hurt since he was able to boil the actual problem down to the very basics. And having designed the Chaparral feed, he knew what had to be done to make it 'convert'.

The photos and the drawings tell the story. Tay took a 29 cent BIC pen barrel and cut it off so that it was 2-1/8" long. He cleaned out the ink, naturally. Then he tapped the barrel at both ends with a 12 x 24 thread which would allow him to screw into the barrel a piece of metal rod which had been similarly threaded with 12 x 24 threads. You may use brass or aluminum for the rod but not steel. Tay used some 3/16" diameter aluminum welding rod and it is cut to 7/16" length.

One of the threaded rods is screwed into the barrel so that approximately 1/8" sticks out of the barrel. If you tap into the barrel at one end only 5/16" the rod will thread in just to the end of the tap-threads and stop. The opposite end accepts the other rod. Now take the plastic barreled rod carrier and slide it into the mouth of the Chaparral feed as shown here; it must be inserted so that it is lodged between the inner walls of the



Chaparral feed pipe 1-1/4" back (inside) from the mouth or opening at an angle that is 45 degrees with respect to the feed probe in the horizontal position.

The signal ignores the plastic BIC pen holder 'carrier' for the threaded rods; the holder is turned until the two metal rods are wedged tightly, straight across the waveguide tube, at the 1-1/4" in location specified.

That's all there is to it! With the feed and LNA now back in service you will have between 2 and 3 dB **more signal** with a RHC signal than you would without the device. Tay and we found that if you insert the carrier plus rods at an angle 180 degrees advanced from that shown (which would be the alignment for left-hand circular polarization) the Molniya or Ghorizont signal disappears completely. The axial ratio for the purists is nearly 3 dB and the polarization mis-match should be a small fraction of a dB. YES - you could improve the performance a fraction of a dB with multiple pins but as Tay notes "...it would be like gilding the proverbial lily..."

And best of all, when you tire of playing with Molniya or Ghorizont you can simply screw-out the 29 cent RHC adapter and return your system to its original unfettered linear polarization!

#### USING THE SUN

The sun, believe it or not, is a very useful tool in system check out. It is also, twice per year, a source of interference to the TVRO terminal.

**Our sun is a radio noise source.** If you have an antenna of sufficient gain and a receiver system of sufficient sensitivity, you can point the antenna at the sun and you will hear a 'roar' in the receiver audio and on the receiver video you will see a very dramatic increase in (white and black) noise impulses. The same general techniques are in use daily by radio astronomy observatories all over the world, tracking (normally) not our sun but rather tracking more distant stars.

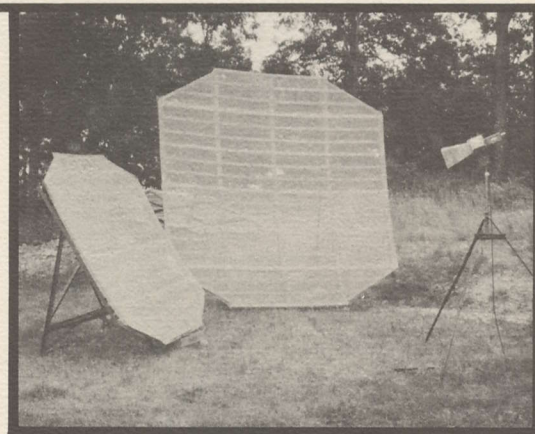
## SOME NOTES ON USING THE SOLAR ALIGNMENT AHEAD

**Your ten foot** (or larger) antenna and your 120-300 degree K LNA and your TVRO receiver is a more than adequate system to 'receive' the sun's noise. Now, why and how would someone actually set out to point their antenna at the sun?

**First of all** you should **never** point any antenna at the sun **unless** it has been painted some light color (flat-white is traditional but other light, pastel colors will do just fine). There was, early in the satellite business, much concern in the CATV terminal field about what paint to use. It was actually thought that a very special light-scattering-pigment dull white paint was required even though it sold for \$265 a gallon more than four years ago! (It takes about one gallon to paint the reflector surface on a 20 foot antenna and many need to be painted every year; at least every second year.) Then it became apparent that the rationale for the expensive paint was being over-sold; true, you do need a white paint (white reflects most of the sun light)

## THE UNBEATABLE PAIR!

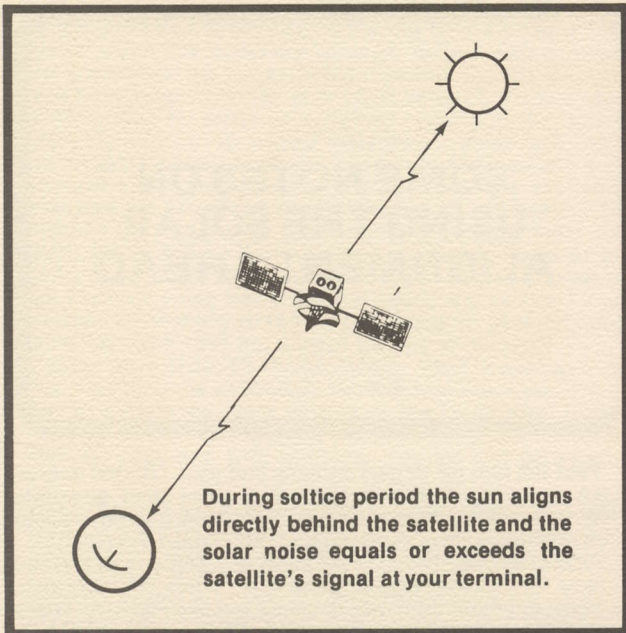
**BY NOW** virtually everyone knows you have at least two good choices when selecting your satellite TV antenna. The parabolic dish, and, the Spherical. And most people now know that the Spherical offers advantages no parabolic can offer. Such as multiple-satellite visibility, far lower wind resistance (the winds blow through the surface), and not insignificantly lower cost.



**THE 8-BALL** is the leading antenna line in the Spherical field. Hundreds of 8-Ball antennas are now providing high quality reception from Canada's frozen north deep into Mexico and the Caribbean. Our popular 12 foot size is now joined by a new 8 foot 'demonstrator special' which extensive testing reveals will perform as well as or better than any 10 foot parabolic on the market today! PLUS - with an 8 foot trailer mounted you can demonstrate the length of the full satellite belt (over any 30 degree span) right at your customer's location by simply moving the feed antenna from bird to bird; leaving the Spherical reflector surface 'in place'. BOTH the 8 foot 8-Ball and the 12 foot 8-Ball are now available in the standard mesh and a new 'tough mesh' for extra rugged applications. Pricing remains \$750 for the standard 12', \$780 for the ruggedized version while the new 8 foot is priced at \$650 for the standard mesh and \$685 for the ruggedized version.

**SHOPPING FOR THE BEST LNA BUYS?** Check with 8-Ball **before** you order because we'll give you a price on brand-new factory sealed Avantek 120 degree (50 dB gain) LNAs with the DC power block that will knock your eyes out!

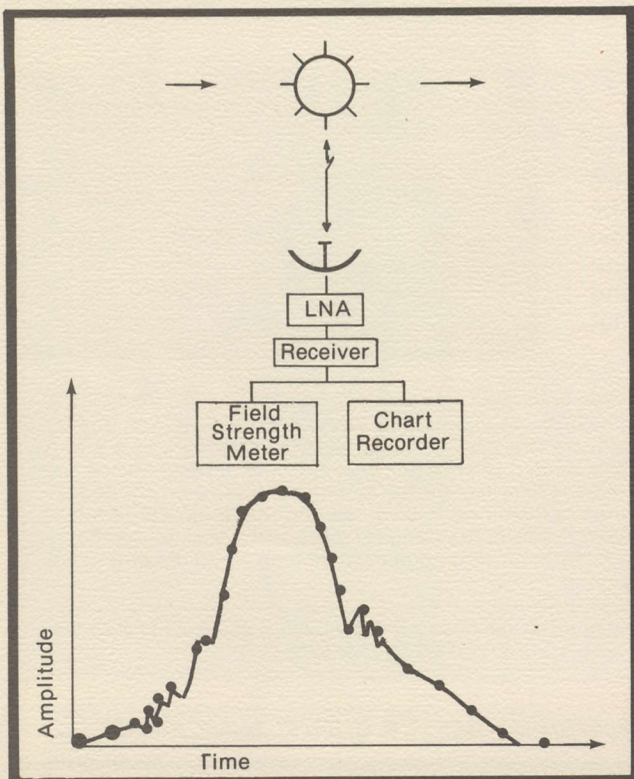




but it needn't cost \$265 per gallon! In fact any reasonably good grade of exterior latex, put on with a roller (you can cover a ten foot dish in around ten minutes, a twenty foot in just over a half hour) is just fine.

**Suppose** you have a metal dish surface and don't paint it? Well, metal is 'bright' and it is a high grade reflector for sunlight. One test of a 20 foot antenna showed that at the focal point of the dish the temperature can exceed 2000 degrees F when the dish is pointed at the sun!

The sun, like the satellite, will 'focus' when the parabolic antenna is pointed directly at it. You can in fact utilize the sun and a thermometer to find the exact focus point of a dish (if the dish is unpainted) but this is a dangerous exercise since the



concentration of rays can get very-very warm (witness the 2000 F temperature). And twice per year, like it or not, the sun will either precisely align with your dish or come close enough to do major damage to anything mounted at the focal point (anything being the LNA, feedhorn, cables et al). When might that be? During the spring and fall, or the equinox period to be exact. As the sun heads north in the spring or south in the fall, give or take 20 days or so either side of the 'solstice' the sun's movement through the sky will take it on a path where it moves along or across the geostationary orbit belt from your location. When this happens the sun will for a period of a few minutes to perhaps 15 minutes maximum directly line up **behind** the satellite. We refer to this period as the twice-annual 'sun' (or solar) outage. In the satellite business this outage is something we just learn to live with. As an alignment from your location to the satellite and then the sun occurs, a slow but dramatic increase in system noise level occurs. The normally clear picture starts to get sparklies in it, the sparklies get very strong, and then for perhaps a minute or two the sparklies are so strong that very little or no picture shows; then it starts to clear up and in a few minutes it is back to normal.

**Why does this happen?** Again, because the sun is a potent radio signal source, even at 4 GHz and when the sun's path aligns it behind the satellite the TVRO antenna **sees** that noise as just another transmitter source. It so happens, by some quirk of celestial mechanics, that with our present generation of 5 watt output power geostationary satellites that their power output at 24,000 to 27,000 miles has almost exactly the same signal level 'on the ground' as the sun 93,000,000 or so miles distant. One (the sun) cancels the other (the satellite) when there is complete alignment.

**You can tell** when this alignment is coming; mark your calendar between September 1 and October 15th or so; the further north you are from the equator the later in the year it will 'hit you'. Between 2:30 and 5 PM local time for SATCOM FI you will notice two to four days of 'solar interference'. If you have a prime focus feed the shadow cast by the feed on the antenna's surface by the sun will fall directly into the center of the dish when there is alignment. Keep an eye on the prime focus shadow in this period; noting that as September moves along the shadow which is below the center of the dish moves slowly, each day, up the dish a little. On the day **prior** to the best alignment the sun's shadow will be very close to the **center** of the dish and on the day **after** it will be slightly above the center. In the spring (between March 1 and mid-April) the process repeats except the shadow location reverses since the sun is now coming back north rather than traveling south.

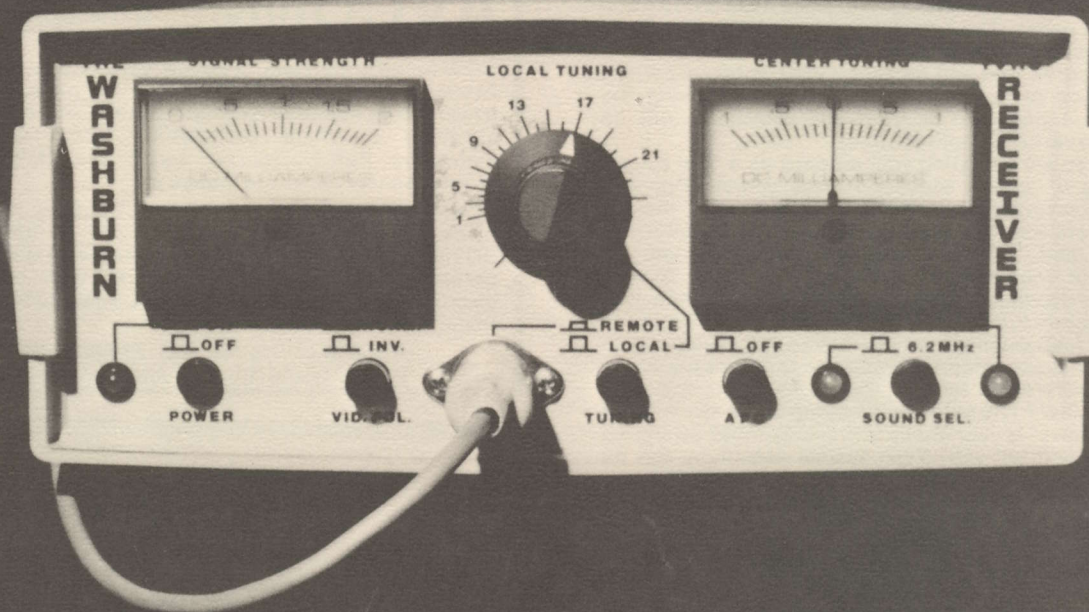
**NOW** - how can you use the sun to test your dish and receiving system? Very simply. On a bright day notice where the shadow is on the dish surface between noon and say 3 PM (if the satellites are in a southwesterly direction from you). Decide how much up or down you would have to move your elevation to get the shadow of the sun during this period of the day squarely into the center of the dish. Then set out to deliberately tilt the antenna elevation so that the sun, as it moves through the sky, will align with your feed throwing the shadow of the prime focus feed squarely onto the center of the dish.

If you start out with your dish 30 minutes (real time - not longitude!) or so **west of the sun** and have the elevation properly adjusted the sun will move westerly and pass directly through the 'boresight' of your dish. How can you use this exercise to your advantage?

- 1] Have the LNA and receiver running.
- 2] Have a (CATV/MATV) field strength meter connected to the receiver IF, or an oscilloscope set to read system noise floor plugged into the video output of the receiver.
- 3] Optionally, if you can locate a chart recorder that will read a 20 dB range (window), have it connected to either the video output of the receiver or the chart recorder output (demodulated output) on the field strength meter.

Now, as the sun moves into the antenna's pattern the broad range, even-strength (i.e. stable output) solar noise machine will produce an increase in the noise level on your receiver. You can read (and write down) this change in 30 second increments on the field strength meter, or you can record it with the recording pen attached to the chart recorder.





## THE <sup>TM</sup> WASHBURN TVRO RECEIVER

### EXCEPTIONAL PERFORMANCE

- **TRUE EXTENDED THRESHOLD** - 7 dB under full video modulation conditions, achieved through meticulous attention to removing limitations imposed by components.
- **HIGH FIDELITY VIDEO** - Full 30 MHz I.F. bandwidth and 8.4 MHz video bandwidth prior to final subcarrier filtering, coupled with heavy negative feedback in all high level video stages for very low differential distortion and controlled transient response.
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- **FULL REMOTE CONTROL** - 25 ft. (extendable) remote allows an untrained user to easily select transponders and control the volume of the High Fidelity Audio Output. Normal transponder selection automatically commands correct feed polarization through a closed-loop servo.
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- **FULL FUNCTION METERING** - With selectable manual tuning and AFC disable allows checks of system CNR without additional equipment. Continuous monitoring of Signal Strength (in linear dB) and AFC Correction (in MHz).
- **VCR COMPATIBLE** - Video and audio levels allow use of your VCR as a modulator, providing immediate recording without cable changes when desired.
- **DESIGNED FOR RELIABILITY** - Careful cost/performance balance to insure continued quality reception.

### SUPERIOR VALUE

- **LOWEST IN-PLACE SYSTEM COST** - "Bargain" receivers stop being a bargain when you add up the antenna and LNA costs for sparklie-free reception with higher thresholds.
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**NOW PRODUCED EXPRESSLY** for designer Clyde Washburn with his supervision of strict Quality and Performance Standards. Receivers, kits, components and factory alignment available!

Direct all inquires to:

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If you write down field strength readings, after the event is all over you can take the readings and place them onto a piece of linear graph paper. Plot each 30 second increment reading and then connect each plotted point together. You will produce a bell shaped curve that will be your TVRO antenna pattern (time or degrees of antenna beamwidth will be along the bottom line; antenna gain or front end selectivity will be reflected by the vertical amplitude line).

In effect you are operating your antenna on a 'test range' and 'sweeping it' with a wideband noise source. Properly done, repeated several times and the results averaged, there is no more accurate way to determine [1] the actual pattern of your antenna, and, [2] with some calculation the gain (or relative gain) of your antenna. Now since the gain of your antenna largely depends upon the pattern of your antenna, and this in turn is a function of antenna size, antenna f/D and the pattern of your feed antenna, you now have a very handy way to experiment with these antenna parameters to determine which is truly best performing for you. For example, is one feed better than another? The antenna sweeping of the sun will tell you. How far 'down' is your antenna first side-lobe? Sweeping of the antenna will tell you. Even system sensitivity can be computed by this test approach.

**This repeated warning however.** When you play with the sun, make very sure your antenna is properly painted! You can check this by placing a thermometer at the focal or feedpoint when you first run the tests. The temperature at the focal point should increase only slightly (by less than 25 degrees F) over the ambient (air temperature when you sweep through the sun. **You don't want to cook your electronics while testing!**

#### ANTENNA SIZE vs. SOLAR NOISE[\*]

The amount of solar noise to be nominally expected with your terminal will depend upon the system antenna size, gain, and system electronic sensitivity. The following guidelines will give you a reference point to begin with; degradations below these levels will tell you there is work to be done, above these levels will tell you that your system is functioning better than the 'normal' system of this size. These numbers assume a 30 MHz IF bandwidth and 120 degree Kelvin LNA. Note that for these tests your receiver AGC must be dis-abled if you are likely to be 'into limiting' with the receiver before the maximum levels shown here are reached; otherwise the levels will 'top-off' prior to the actual peak indicated level.

Antenna Size	Nominal Gain	HPBW[**]	Antenna Noise [K]	dB Noise
6'	35.0 dB	3.02°	460°K	4.1 dB
8'	37.5 dB	2.28°	800°K	6.6 dB
10'	39.5 dB	1.82°	1300°K	8.5 dB
12'	41.0 dB	1.47°	1850°K	10.0 dB
15'	42.9 dB	1.18°	2800°K	11.9 dB
20'	44.5 dB	1.00°	4100°K	13.5 dB

\*This assumes a 'quiet sun' (i.e. one not aggravated by a solar storm created by extraordinary sunspot activity).

\*\* - Half-power beamwidth for the antenna, indicating the total 3 dB portion of the antenna pattern curve at the nose of the pattern. For example, a 3.02° HPBW indicates that 1.51° either side of the center of the antenna pattern the signal level (solar noise) should be -3.0 dB reference the center. Note that for the antenna sizes greater than 20 feet the HPBW of the antenna (which will be smaller than 1°) creates a new measurement adjustment since the sun's surface subtends a 0.5° arc in space and larger antennas are actually capable of focusing on only a portion of the sun's surface resulting in reduced readings.

**LOOK FOR** vastly improved situation for Washburn Receiver kits and wired and tested units very soon. Clyde Washburn has completed contractual agreements with major developer / supplier of microwave hardware and is now fulltime himself on project. Washburn and former supplier terminated their agreement on July 1st and fate of the novel

## AVCOM-

SETTING THE PACE  
OTHERS FOLLOW  
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**NOW in full production**, AVCOM's COM-3 and COM-3R 24 channel satellite video receivers! The 'hit' of San Jose because they combine excellent styling with the superb extended threshold performance that made our innovative PSR-3 receiver series the standard of comparison for the entire industry.

**COM-3 features** 24 channel switch-tuning; **COM-3R** gives the user remote control of the switch-tuning. BOTH have the best low-signal-level extended threshold performance in the industry today with a unique discriminator circuit that makes PLL equipped receivers 'pale' by comparison.

AVCOM of Virginia, Inc. • [804]320-4439  
10139 Apache Rd., Richmond, VA 23235

## TECHNICAL NEWS NOTES

receiver was up in air until just recently. Washburn plans 50 kits per month initial capacity to be followed as soon as October with about the same number of wired and tested units per month. Pricing for kits and wired and tested units will drop by about 30% from previously published prices. You can get ahold of Washburn direct and get assistance at 716-223-7457 from 9 to 5 weekdays or write firm at P. O. Box 636, Fairport, New York 14450.

**WATKINS-JOHNSON** so impressed with growth and direction of low-cost terminal industry in San Jose (they were there as guests of John Ramsey) they are talking of off-the-shelf delivery (!) on wide range of VTOs by 1 November. Included are V815 (2.7-3.7), V707 (.875-.915), V802 (2.4-3.7), V901 (3.6-5.0) and V907 (3.6-4.2). Val Jackson at 408-438-2100 can fill you in.

**\$995 MAY NOT** be 'low priced receiver' by SBOC. David Barker's image-cancelling single conversion approach (see CSD for June) headed for marketplace as 'ultra-low-cost' receiver likely to be in \$700 price range when announced.

**ANCHORAGE** (AK.) cable system will be first to use COMSAT licensed 'Torus' spherical antenna. This version will look at 20 degree window from 136 to 116 degrees taking in 5 satellites but only 2 of which will have regular program video of interest to cable systems. Size will be 10 meters.

**JUMP** in home VCR (1/2") market worldwide likely to lead to parts shortages in allied areas. Likely tight areas will be small signal transistors and ultra-compact capacitors. Japan predicts monthly VCR output of 540,000 by December.

**MAJOR CHANGES** in Britain policies towards private investment and operation of space facilities may herald total turn about of small industry there. Latest proposals would greatly reduce influence on communications by Post Office Telecommunications Office. Country now proposing SBS (business system satellite) program to be operated and owned largely by private investors. Earlier proposal for direct broadcast television service still alive.

**FACSIMILE** newspaper service has been tested in Japan



utilizing UHF band satellite launched two years ago. Extremely narrow band system greatly reduces size of receive terminal antenna package allowing under \$250 individual home terminals to access bird signal. Not applicable to wide band (video) at moment.

**LATEST** Spanish International Network Satellator (translator fed directly by satellite) now operating in Albuquerque.

**SHUTTLE** propulsion unit suffered another abortion when scheduled test of system was shut down less than 20% of way through test sequence.

**LOOK FOR** renewed battle of parabolic feed system designers to start any day; success of Tay Howard designed Chaparral 'super feed' has spurred rapid development of additional scalar feed designs and new battle of specs is bound to ensue.

**ONE OF** the more interesting 'new' antenna designs scheduled for debut at SBOC Houston is 10 footer that inter-locks together like Prodelin design seen in San Jose. Designer utilizing foam-filled construction technique for

parabolic surface, antenna mount system and feed with result being ten foot antenna weighing around 150 pounds complete (with mount) that knocks down for shipment to UPS dimensions and pricing in \$1500 quantity one region.

**ANOTHER** possible source for SECAM Monitors; NBC had massive order with Tektronix of several hundred units scheduled for shipment to Moscow. At least 100 were shipped prior to pull out of Olympic coverage and may not have reached destination in which case they will be returned. Modules to build equal number reportedly in stock at Tektronix factory.

**FIRST 20** foot Paraframe antennas scheduled for delivery this month; units will go to South Florida.

**CSD SUBSCRIBER NOTICE:** If you are moving or for some other reason wish your CSD shipped to alternate location we must have the computer address label from your mailing envelope (showing old address and certain key numbers) plus know month in which your subscription began. Since CSD is mailed first class mail it will be forwarded to your new address in interim. Save an envelope label in a safe place 'just in case'.

## GOOD NEWS FOR

Bob Cooper has prepared a custom sales demonstration videotape for you! Running approximately 11 minutes, 'The Satellite TV Story' captures the excitement and spirit of having satellite TV in your home. Perfect for one-on-one pre-selling, groups, un-attended displays. Color of course, prepared by Coop so that viewers grasp the essentials of a home terminal and how it works. AND - on the same (VHS or BETA) tape is approximately 50 minutes of 'informal Coop' directed to installers and dealers filled with system installation pitfalls and solutions. Excellent for training your people!

This custom videotape is available on BETA or VHS. The price is \$60 per copy but for an extra \$10 we'll 'tag' it with your company name, address and telephone number. Shipment within seven days of receipt of order. If you order the 'tagged' version be sure to specify what the tag is to say, and tell us whether VHS or BETA. **Order STP-1.**

**PLUS** - The world-famous 'Satellite TV Handbook' (more than 15,000 in print now) which has introduced tens of thousands to home satellite TV (at \$7.50 each) is now available in **50-Handbook-Bundles** for \$125 (postage paid within US, Canada). The perfect introductory piece to satellite TV and each copy carries the full \$7.50 list price. Sorry - only available in bundles of 50. **Order SEP-1 at \$125.**

**SAVE EXTRA MONEY** by ordering 'Combo-Package' including a 50 bundle of Handbooks plus STP-1 videotape. Price is \$175 US and Canada or \$185 with custom tag on videotape. US funds only. **Order CP-1.**

## TVRO DEALERS/ DISTRIBUTORS/ MANUFACTURERS!



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# SBOC'80

## HOUSTON

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### SATELLITE BUSINESS OPPORTUNITIES CONFERENCE

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A very special kind of **Satellite Seminar for professionals** looking for the right answers to getting into the satellite TV business; profitably. So special that we call it a business opportunity conference. Which is exactly what it is...a gathering of people and firms who are looking for the best combination of marketing strategies, hardware packages and services to offer to the television viewing public. Only SBOC Houston doesn't stop there. Intensive three day session includes a hard look at **every aspect** of capitalizing on the tremendous potential in low-cost satellite systems. From uplink ownership and operation to programming packages via leased satellite transponders. Dozens of exhibits, dozens of hard hitting seminar sessions, more than 30 hours of special in-house television programming from past SPTS events. **PLUS** - the very latest in new technology from new super light weight antenna systems to complete terminals that have all of the electronics integrated into the dish antenna. If you believe there is money to be made in the low-cost satellite communications field, you need to be at SBOC '80 Houston!

**SBOC '80 / HOUSTON** - November 17-18-19, 1980

**SBOC '80 / HOUSTON** - The Adam's Mark Houston Hotel

**SBOC '80 / HOUSTON** - Registration fee (includes special new business opportunity manual) is \$150 per person

**SBOC '80 / HOUSTON** - From the same folks who bring you SPTS, CSD and a world of practical satellite information. Use registration card to right.

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### SATELLITE BUSINESS OPPORTUNITIES CONFERENCE

## SBOC '80/HOUSTON



## COOP'S COMMENT ON PROGRAMMING

### MY PROBLEMS WITH HR 7747

This month's programming section includes the text of House Bill HR 7747, the so-called anti-piracy bill now heading through Congress and attracting the support of MDS, STV and many of the satellite TV transmission service programmers. As detailed last month and to additional extent in this issue of CSD, the bill is dangerous to the extreme of being terrible overkill. How anyone can rationalize a \$250,000 'fine' for interception of a MDS, STV or indeed satellite TV transmission is almost beyond comprehension. We are all painfully aware of the ravages of inflation but this is absurd!

My primary complaint is not the irrational nature of the bill which throws everyone receiving MDS, STV and satellite transmissions into the same black pot but rather with the brakes this bill is likely to place on the development of American low-cost space technology know how. We constantly hear complaints in this country that as a nation we have abdicated our industrial technology lead to Japan and Europe. That we have become a nation of importers rather than our long held posture of being exporters. I am now beginning to suspect that we have lost our technology lead because we legislated American know how right off shore!

No nation in this world has done a thing with low-cost 4 GHz technology except America (and a handful of Canadians). The thousands of people who have accepted the 4 GHz challenge in their workshops and small business firm labs have shown that American ingenuity, if allowed to mature on its own, is still very much capable of grabbing the lead world wide. A relatively small cadre of non-affiliated technologists including Howard, Coleman, Ramsey, Washburn, McCullough and perhaps a dozen or two more have shown us just how well the American system can work given a chance. HR 7747 wants to kill all of that and in doing so I can see 4 GHz technology heading for Asia in one big hurry.

HR 7747 wants to penalize anyone who tunes in a satellite transmission which he does not have authority to tune in. The United States Department of Justice, in a formal filing with the Federal Communications Commission on March 26, 1979

addressed itself to this very question while commenting on FCC Docket 78-374 (wherein the FCC did away with licensing of receive terminals). In that 1979 filing the DOJ said "(one) rationale devised in support of the Commission's present receiver licensing programs is that these receive-only terminals can potentially be used for unauthorized reception and possible divulgence of information relayed via domestic satellite systems. Under Section 605 of the 1934 Communications Act, it is illegal to intercept and divulge the content of non-broadcast radio signals."

I question why the FCC or any other federal enforcement agency should be in the business of 'protecting' private transmissions. The DOJ in their 1979 filed notes "The FCC is not a guarantor under the 1934 Communications Act of private commercial operations...presumably commercial firms are as capable of protecting their own commercial interests as are federal regulators...Indeed, should the problem of satellite transmission 'pirating' materialize, there are essentially no real economic or technical reasons why those transmissions could not be 'scrambled' and the problem eliminated promptly as a consequence".

I intensely dis-like 'personal interest' legislation; that is law created to help one group to the detriment of another. I especially dis-like such legislation when it is enacted because the groups being helped are simply too lazy or cheap to do what the DOJ suggests they should be doing if they are concerned with piracy; i.e. scrambling. To paraphrase the DOJ comments one paragraph back... 'The US Government is not a guarantor of private commercial operations'. We need less government, not more government intrusion in our private lives. Good grief.

Worse yet there is already in place plenty of legislation to give MDS, STV and satellite programmers concerned about piracy tools to enforce their complaints. The DOJ 1979 FCC filing notes "...Section 605 can be the basis for Federal criminal prosecutions...(additionally) the 1968 Omnibus Crime Control Act makes the mere interception of protected communications a Federal crime (and moreover this statute) affords injured parties special civil right of action (including) liquidated or actual damages plus attorneys' fees...(finally) the unlawful interception of copyrighted programming using receive-only antennas may under the 1976 Copyright Act render persons subject to civil infringement actions, suits for injunctions, the impoundment and recovery of profits and other remedies".

We don't need new, additional, expensive special interest legislation. As our Department of Justice notes there is ample legal remedy for prosecution of unauthorized interception of private communications. HR 7747 is an example of private business attempting to mis-use the federal government's legislative powers. The consequences of this legislation will be the potential loss of America's technology lead in low-cost satellite communications systems. Worse yet, such a law will scare away many legitimate public uses of low-cost satellite communications technology because only the bottom line will be remembered; a fine of \$250,000 per individual infraction.

Together we can do something about this. S.P.A.C.E. is our best hope.

CSD

PROGRAMMING



COOP'S SATELLITE DIGEST (Programming Section) is published monthly by Robert B. and Susan T. Cooper doing business as Satellite Television Technology (STT). Editorial offices located at West Indies Video, Grace Bay, Providenciales, Turks & Caicos, BWI. Communication with editorial office is through Business Office at P. O. Box G, Arcadia, OK 73007 (405-396-2574); Rick Schneringer, Manager. Photography, Kevin Paul Cooper; editorial assistance Tasha Anne Cooper. STT produces various manuals, videotapes, guides and texts plus conducts the twice annual SPTS and once-annual SBOC events. STT is not affiliated with any manufacturer or distributor of satellite communications equipment. CSD subscription \$50 per year US / Canada / Mexico; \$75 elsewhere. Total contents copyright 1980 STT, USA & Turks and Caicos.



## GETTING CSD READERS OFF THE 'PERMISSION' HOOK

### CLEARING MY CONSCIENCE

You don't have to read between the lines (as Steve Reed would say) to know from my 'Comments' section that I believe Representative Preyer is way off base with his proposed HR 7747. When I see folks like John Ramsey staying up for nights on end to design better low cost receivers or David Brough flying all over North America to help people put in low-cost spherical antennas or Tay Howard giving serious thought to leaving Stanford for a life of dedication to low cost satellite technology, I know we are all in this together and that we have to stick together; **or get it stuck to us!**

I have read and re-read the words of HR 7747 and I have read and re-read a ten page letter to Representative Preyer created by SPACE General Counsel Rick Brown and I have come to several conclusions about where we stand. The first is a negative. This is already an emotional issue and it is going to get much worse before it is through and done. Big business bucks are entering STV (over the air subscription TV) and MDS (multi-point distribution). **Big bucks are already** in the premium programming end of cable. These people are playing for keeps and they don't want to see the spread of what we all espouse. Well, we may be the little people but we don't have to roll over and play dead.

I think there is a fair chance this bill will get swift action and even approval. It **may** happen so fast that it sets a record or two. The only reason it might **not** be SPACE, and, this being a national election year (such years have a way of breaking up the Washington gathering much earlier than normal).

So in thinking about how to be sure that all of you people who are now into this 'satellite silliness' as Steve Gibson calls it do not get hung out to dry by this legislation, I decided something had to be done to protect you from yourselves. At San Jose I talked with dozens of people whom I asked **"Say - have you ever bothered to contact any of the free services on the bird for their written permission for you to access their transmissions???"**. One said he had, several said they had meant to, most said 'no' they had not.

As I read HR 7747 you can get hung if you get caught watching something you don't have specific permission to view. Carrying that one step further if some federal person were to knock on your door and ask for entry, you would have at least an opportunity to make sure your kids were not switching to a transponder you were not supposed to be watching. Fred Hopengartern maintains that they will need either your permission to get into your house to inspect what you are watching or a court order granting them access.

But suppose you have a 12 foot dish out there in the yard and their first question is **"Do you have permission to view satellite services?"**. I think you had better have at least one piece of paper, stuck away in a safe place, which you can trot out to show if called upon. That piece of paper should clearly state that you do have such permission. Yet in San Jose I found virtually nobody who had bothered to take that simple step (my own files are filled with letters from virtually everyone; HBO being the exception of course).

**OK** - if this is the way you are going to handle your own 'security' I'll do it for you. With this report is a certificate. On

this certificate is clear language that tells anyone who comes to your door that **you have the official permission of CBN** - the Christian Broadcasting Network - to tune in their programming on SATCOM FI transponder 8. There are two things you **must** do to make this certificate worth the paper it is printed on:

- 1) You should cut it out of CSD and carefully type or print in your full name and your city and state (this certificate is good in Canada, the Bahamas, Mexico and anywhere else that FI transponder 8 can be viewed);
- 2) You must then send off a letter or a postcard or a piece of birch bark with a stamp on it as follows:
  - a) **Address it to** - Mr. Scott Hessek, Manager CBN Satellite Services, The Christian Broadcasting Network Inc., Virginia Beach, VA 23463.
  - b) **In the letter** or on the back of the postcard or down the side of the birch bark, tell Scott your full **name** and mailing **address** and also include your **CSD** mailing label computer **number**.

**That's all you have to do.** At this point you are fully certified by CBN to access their FI transponder 8. You will also receive in the mail each month a copy of the CBN Programming Guide (yes, even down to Mexico!).

Now this is not a shakey subterfuge; this is no end run **trick** to get around any law or regulation. **It will hold up and it is valid and legal.** Under a letter to me dated July 23, 1980 Scott Hessek has given me (and CSD) the official permission of CBN to **'given permission to all of the people who operate private earth terminals'** to view CBN. Furthermore as Scott says **'there are no strings attached; it is our pleasure to do so for we make the programming available so people can watch it'**.

Leaving the certificate intact in CSD won't cover you. It has to get out of CSD, be completed with your full name and city and state (or province) you reside in, and you must send your **CSD** computer label **number** plus your name and address to Scott's attention to complete the validation process. Mine has already been mailed (that's one of the few bonuses I get as editor and publisher; first access!).

**So where does that place you?** Where, if and when any authorized agent of any authorized federal agency ever knocks on your door, you can simply show him the certificate and state with a clear conscience. **"I have the full, written registered permission of The Christian Broadcasting Network in Virginia Beach, Virginia to be viewing their programming on SATCOM FI transponder 8...and that is why I have that 12 foot terminal in my yard and this room full of receivers, LNAs and recorders"**.

I want to make sure everyone understands this is not some cutesy-idea conceived in a moment of passion. Quite the contrary, I believe we have to be prepared to defend our rights to view direct satellite transmissions when and where we have the clear rights to view and I don't want to see any of the early pioneers (which includes you if you are reading this) caught up in some emotionalism that puts you out of business before this industry really gets off and running.

**YES** - similar program permission can easily be obtained from PTL, Trinity and the new National Christian Network. For very little money permission from C-SPAN, Nickelodeon and CNN will follow. Most of the others cost a few more dollars but many of these will also grant you permission.

**My fear** is that you are so busy messing around with better antennas, neater LNAs and simpler receivers that you are putting off doing something that you may later regret. **OK** - I have done most of the work for you. And now my conscience is clear; the rest is up to you!

### CBN STATUS

CBN is...

- 1) 24 hours per day on FI transponder 8
- 2) Offering alternative competitive programming
- 3) Classified as a programming service rather than a television station or as a 'Common Carrier' and it is copyright and black-out free
- 4) The owner of all of its own programming and no programming use fees apply
- 5) Available to you via telephone at 804-424-7777.



# OFFICIAL

PERMISSION  
TO VIEW  
SATELLITE TV  
FROM...



CBN  
Satellite  
Services

**THIS CERTIFICATE**, issued by Coop's Satellite Digest and by The Christian Broadcasting Network (Inc) grants to a pioneer in the home/private satellite television industry full permission to receive the satellite television programming service of The Christian Broadcasting Network as presently carried on RCA SATCOM FI transponder 8 or as subsequently carried on any US or Canadian domestic satellite or on any other satellite where The Christian Broadcasting Network has entered into a contract for the transmission of its programs. This certificate grants to the home/private satellite TV reception pioneer named hereon permission to view and to share with others without cost the full 24 hour per day programming services of 'CBN'.

**THIS CERTIFICATE** recognizes the contributions already made by pioneers in this field and further recognizes that such pioneering efforts have led to the development of efficient, cost-effective private satellite terminals for all of North America. CBN and Coop's Satellite Digest jointly urge the continued pursuit of such technology for the good of all mankind and the eventual recognition that through the development of such low-cost satellite technology mankind the world over will one day live in greater harmony and peace.

**THIS CERTIFICATE** is granted to \_\_\_\_\_

residing in \_\_\_\_\_, \_\_\_\_\_ and is issued without charge or qualifications on this 1st day of September in the year of our Lord 1980.


For Satellite Television Technology

For The Christian Broadcasting Network







## NEW MANUALS FROM STT



① **Stephen Gibson's 'THE SATELLITE NAVIGATOR'** is possibly the finest manual ever assembled by STT. Author Gibson covers every aspect of satellite 'navigating' (i.e. the art of finding satellites from your spot on the ground) and **he builds into this latest STT manual** cleverly designed navigational aids including an inclinometer (to measure your antenna's elevation) and a Sun Compass (to help you accurately measure azimuth). Gibson goes from the very elementary mount (a laundry pole in the yard) to super sophisticated mounting systems including a complete electronic interface box to tie your motor driven dish antenna to your TRS-80 (or similar micro) computer for full 'autodish' operation. Filled with practical tips on mount design and construction, step by step instructions on 'boresighting' the satellites, computer programs galore and the word of an experienced man on trouble shooting your system. Bob Cooper says "I read this manual six times during the course of preparing it for publication; each time I found myself discovering new ways to modify my own antenna mounts. This manual may well be a curse to my spare time; after reading it I have dozens of new projects to get started on!" The price is \$30 postage paid US, Canada, Mexico; \$35 elsewhere. A must for any serious satellite terminal operator.



② **Nelson Ethier's 'PARABOLIC TVRO ANTENNA MANUAL'** will probably make several people independently wealthy. Here is the full 'game plan' for starting up a business building 10, 12 (or larger) foot TVRO antennas, mounts and feeds. Nelson's manual will make everyone an instant expert on the nitty-gritty world of building superb, high-quality parabolic reflector surfaces. He uses a combination of fiberglass and metal to produce a professional looking, high-performance dish that virtually **anyone can duplicate** from his step-by-step plans for between \$300 and \$500. PLUS - he suggests that after you build a mold for your first dish that you rent the mold around to others in your area so that you in effect become a supplier in the antenna field! Nelson is a bug for having precision workmanship and he gives you complete instructions on achieving a 1/8th inch surface tolerance over the 12 foot surface. Formulas and instructions included will assist anyone who wants to build larger-than-12 foot antennas to do so. What a neat way to turn your garage into a factory! The price is \$30 postpaid in US, Canada and Mexico; \$35 elsewhere. Don't start building your own antenna until you study this manual carefully!



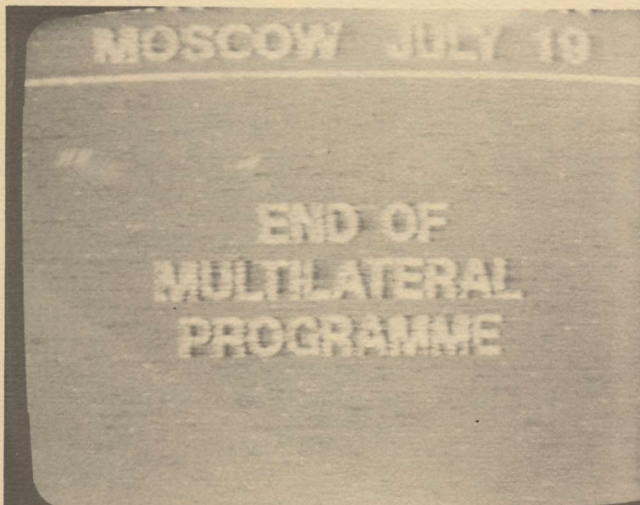
③ **Bob Cooper's 'SATELLITE OPERATIONS MANUAL'** probably should be kept under lock and key in your TVRO viewing room. Coop has been assembling data from people who like to mess around tuning in 'the hidden stuff' on satellite transponders for years and now he gives away all of the trade secrets. Like finding network executive intercom audio channels, news-wire teletype channels, the Moscow-Washington 'Hot Line' RTTY and voice link back-up on Molniya and more mundane stuff like several dozen Holiday Inn 'Holidex' - 800-number reservation lines on satellite. He tells you where to tune in four different Anchorage, Alaska AM radio stations sent out via satellite, Alaskan flight weather, and hundreds more. PLUS - this manual is more than a clandestine sourcebook for the secret services. It includes dozens of step-by-step instructions for LNA and feed system operation, sub-carrier units, and a whole chapter on the latest Russian Molniya reception techniques. It even has a section detailing re-broadcast of satellite received channels via low-cost VHF television translators (including a look at such an installation). A section on trouble shooting your system; more than 20 chapter-sections in all! If you are into satellite reception, you need this new Coop manual. If you are thinking about getting into satellites, one look at this book and you won't rest comfortably until you too have your terminal up and running! The price is \$30 postpaid in US, Canada and Mexico; \$35 elsewhere.



## RUSSIAN OLYMPICS VIA MOLNIYA AND GHORIZONT

The news headline in the Miami Herald read 'Antenna Dishes Out Moscow Olympics'. Another headline read 'Antenna Puts Him on Wave Length With Olympics'. Front page coverage in the New York Post and numerous reports carried on NBC-TV, CBS-TV and overseas by various international television services and news wire services turned Miami's Bob Behar into an instant celebrity during the recently completed Moscow Olympics. **Behar did it again** (see CSD for August); he put his 16 foot dish to work collecting 'forbidden' signals and then saw to it that his business (A-B Electronics, Hialeah) got massive publicity.

Not everyone who had the equipment, time and inclination for tuning in the Russian Olympics via a Russian satellite got the exposure that Behar got. Perhaps they can be just as glad they didn't for shortly after Behar's report appeared on national television he got an official telephone call from a gentleman who introduced himself. "I am XXXX and I am with the State Department in Washington...". What did this caller want? "I am instructing you to cease and desist tuning in those Russian satellites". Behar quickly called us and we sent him to Rick Brown, General Counsel for S.P.A.C.E. In a later interview on another national television program we heard Behar tell the reporter "No, I don't feel I am in any danger or jeopardy for tuning in the Russian satellites. The Russians are not a party to INTELSAT and to the best of my knowledge the US has no agreements with Russia which address the question of our citizens tuning in Russian satellites or Russians tuning in ours". We suggested to Behar that his only real jeopardy with tuning in Russian TV was from Russia itself; he should keep an eye peeled for armed cossacks!



**OOPS - WHO HID THE CAMERA!** [Everyone is entitled to get excited Bob. Is that Moscow, Idaho???

Well, so tuning in Russian satellite TV stirred up quite a storm! Actually it only did **after** Behar made the national and international news services. The BBC called from London and one of the more amusing anecdotes involves a call Bob got from Rede/TV Globo's New York City office. Globo is Brasil's largest television network and their news chief in New York thought Behar's achievement would make a good news feature for the folks back home. "I am sending down a news crew tomorrow from New York" said the news person. "Ahh, OK" responded Behar "while they are here I will let them watch your evening news from Rio de Janiero". A long silence followed. Finally the news type spoke. "You mean you can watch our news program from Miami???" Behar assured him that he not only could but frequently did watch the 6 PM newscast from Brasil via the INTELSAT feed which most readers of CSD now know is well received in the eastern 40% of the USA from a bird at 24.5 degrees west. "I have to see this myself" said the news type. "I'll do you one better" said Behar "When you run the story on me in Brasil I'll tape it here in Miami and send you a copy!" responded Behar. The news type muttered something in Portuguese that we probably couldn't print in this family publication even if Behar had understood it.



**"YOU MEAN YOU CAN WATCH OUR NEWS right there in Miami?"** [If you don't think the Brasilians are fanatical about soccer take a close look at the 'O' in Globo!]

Many of the news stories bothered to check out Behar's activities with various US government representatives. A UPI wire news story that moved at 1722 hours on July 22nd quotes an FCC Attorney identified as James Keats as stating "More and more people are using these earth stations and picking up transmissions. It could very well be a violation of Section 605 of the FCC Act of 1934". Another FCC engineer quoted in the same UPI story admitted "The airwaves are free (Behar said they were repeatedly when talking to the press) but some signals are not meant for public viewing". He meant that you are supposed to have permission to tune in such signals.

Behar's response was classic. "Who am I going to call...the Russians...to ask permission???"

If Behar's activities focused attention of the reception possibilities with non-US satellites others less prone to creating publicity did their own thing quietly. Satellite Pioneer Lynn Hurd in Beaverton, Oregon laid claim to being the first person in the US to receive a Russian color signal. He managed to stay up all night when the Olympics started and armed with a 120 degree LNA, a 10 foot dish and a homebrew receiver he was able to get what he described as good looking color from Molniya shortly after the Olympics started by begging a few SECAM color monitor modules from his place of employment; Tektronix. Behar was also watching color, but not from Molniya as we shall shortly see. And not on a Tektronix monitor either: Behar found that because Miami is such an



international city he was able to locate a ready supply of combination PAL/NTSC/SECAM color RF receivers with switchable color standards on numerous retail shelves in Miami! We'll tell you about that also since he appears to have found a solution to at least a part of the multi-standards problem here in North America.

#### As Many As Six

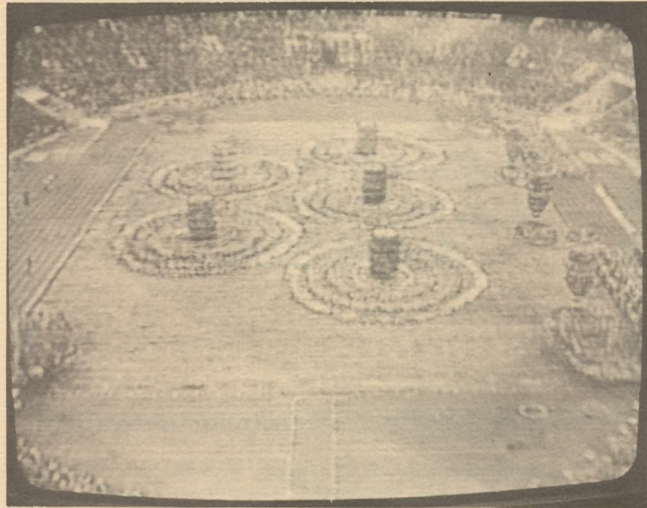
Counting Molniya's single TV transponder it was actually possible for **some** North American viewers to tune in six different channels of Russian Olympics coverage all at once(!). If you are a careful reader of **CSD** you noticed a brief report on a new Russian Ghorizont bird operating at 14 degrees west in the August issue. That's where five of them were.

Ghorizont is the Russian 'horizon' bird. Yes, that means that it has a global beam pattern. And from 14 degrees west it can see quite a chunk of the earth as the coverage map here shows. Now there has been Ghorizont activity at 14 degrees west since mid-1979. The Russians launched Ghorizont II to that location in 79 and it was this bird that the Miami SPTS crowd was searching for when we stumbled onto INTELSAT at 24.5 degrees west last February. England's Steve Birkill has been keeping tabs on Ghorizont since it first appeared in the sky. When Ghorizont was first put into operation in 1979 Birkill noted that it had **perhaps five** transponders with video capability and one that was dedicated to SCPC data. The last full check Birkill made of this bird was in December in 1979; when he next looked in February the bird had lost **all but one** of its TV transponders and there was no SCPC data there anymore. Apparently sometime around the first of the year Ghorizont II blew a large portion of its powering system and to keep the bird active at all the Russians trimmed off everything but a single TV channel which they needed for western Russia. So in fact when the SPTS crowd was looking for Ghorizont in Miami the chances are quite good that it was only operational on a single channel or perhaps not operational at all at that precise point in time.

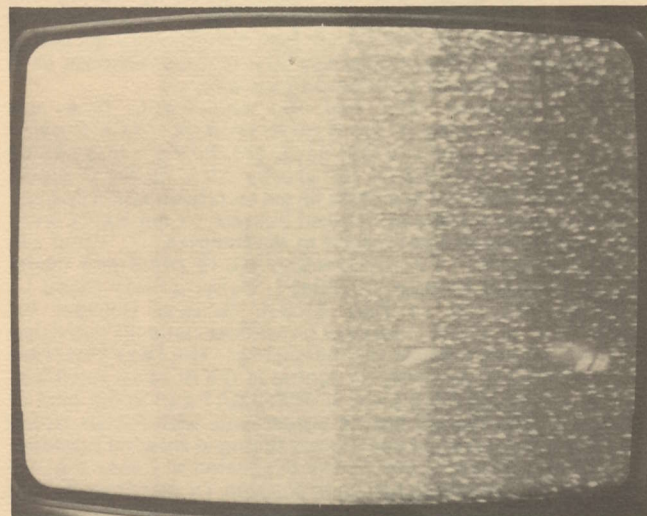
**The Russians limped along with a sick bird** at 14 west until late in June when they got Ghorizont IV into place at the same location. Steve Birkill spotted it almost immediately and advised us that the IV replacement was operating well and with stronger signals than the II bird. We in turn alerted several people along the eastern seaboard, including Behar and it took Behar only a few minutes to run his motorized 16 foot Paraframe to 14 west and tune in the multiple-channel signals.

"**My God...it is flat strong**" reported Behar excitedly. How strong we asked. "I think **one transponder is as strong as SATCOM FI here!**" was the response. Well now, this was more like it. Five channels of Russian relayed television, two dedicated to internal Russian service and the other three carrying a mixture of eastern and western European programming. Birkill reported seeing a wide variety of program feeds prior to the massive Olympics coverage (which dominated Ghorizont IV for two weeks) including a Hungarian rock show, native language French, German, Swedish and other programming including Italian. And with the kind of signal levels being placed all over its visible globe (40% of the surface of the earth) it looked as if **REAL** live European (and Asian) programming was finally going to be available in the western hemisphere!

Ghorizont IV's operational characteristics are not totally published so we must base our own assumptions on observations; many of which will come in over the next few months. It looks to Birkill as if all five of the TV transponders are in the **34 dBw** region in **England**. It looks to Behar as if Russian transponders 1,5 are in the 32 dBw region in South Florida with others down from 3 to 8 dB. The signals are right hand circular polarized. And the audio? Birkill found the normal program audio on the Russian standard 7.5 MHz sub-carrier. Behar found more sub-carriers operating during the Olympics with audio on 5.5, 6.2, 6.8 and 7.5 MHz. During the Russian transponder 5 feeds he found Russian audio commentary on 7.5 MHz, Spanish audio coverage on 6.8 MHz, English (!) audio on 6.2 MHz and some fourth language on 5.5 MHz. Yes, Behar was able to follow the English language commentary on Ghorizont IV just as if it were a US DOMSAT transmission. During some of the transmissions he even found multi-language titling or captioning on the sporting events on



**MOSCOW OLYMPICS opening ceremonies as viewed in South Florida. You ought to see the original color in this! [NTSC never looked so good.]**



**WEAKER GHORIZONT IV transponders look about like this TR2 picture on a linear feed and 16 footer in South Florida. Say you're getting a 20 footer Roberto!**

Russian transponders 1 and 5; including English.

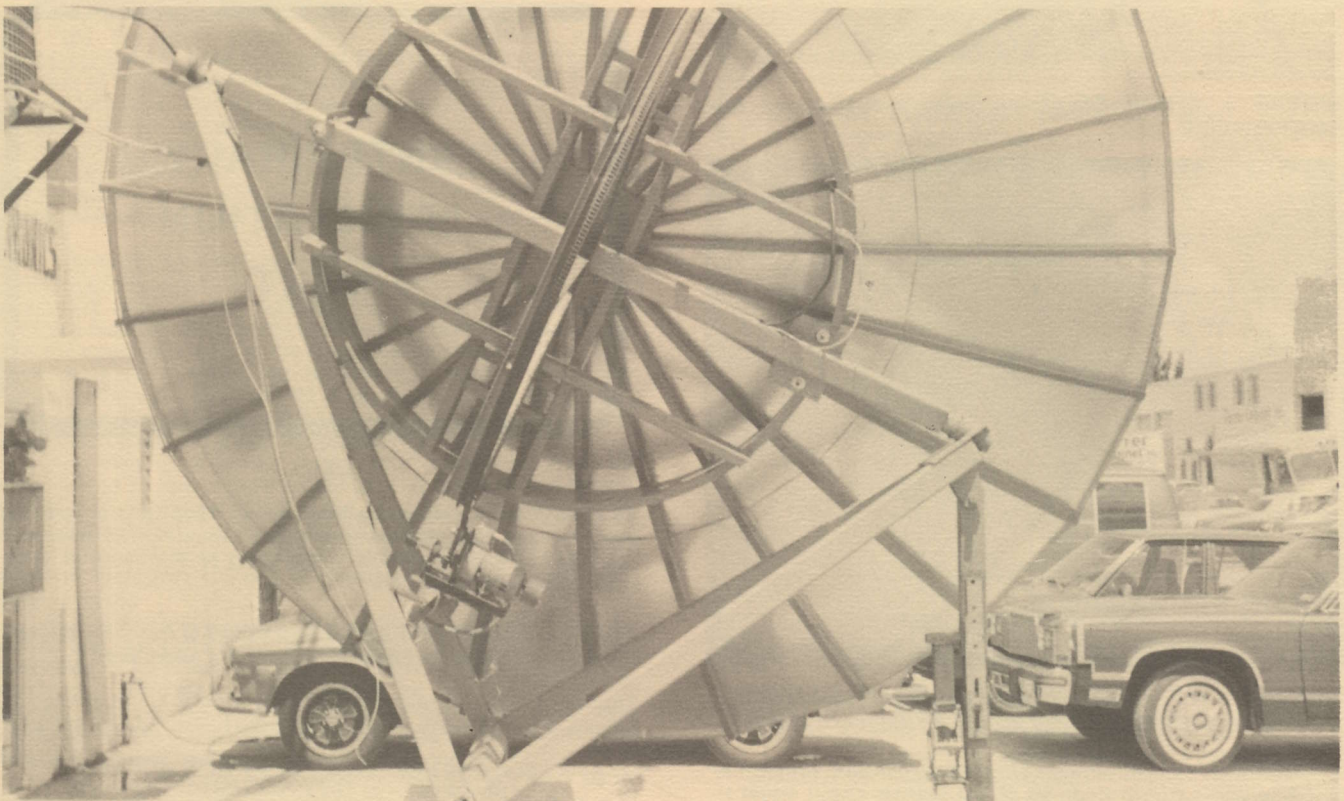
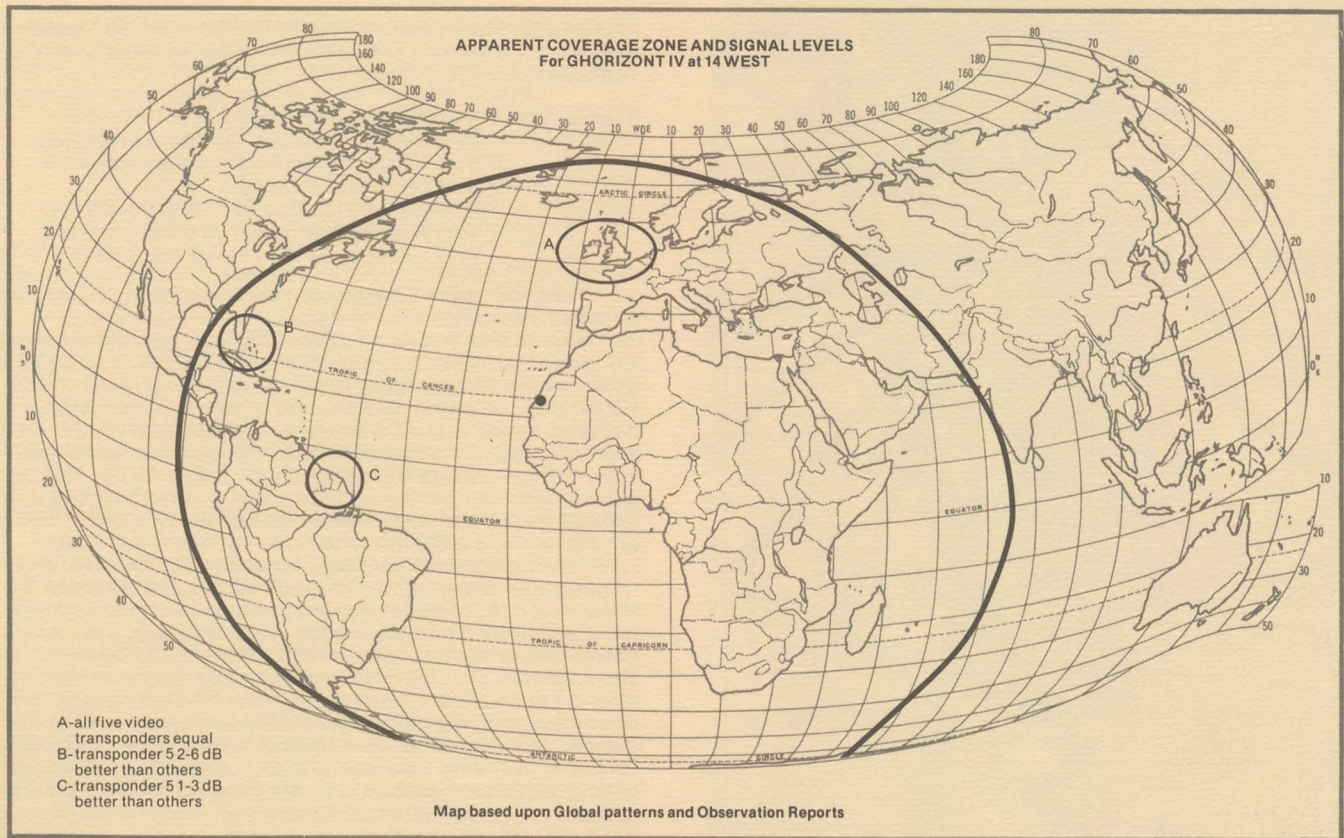
**The signals on a 16 foot dish in Miami** are strong enough that even with a **linear** feed the picture quality is very good; at least on transponder 5. We sent Behar down our 'Bic Pen' Chaparral right hand circular feed adapter (see separate report in this issue of **CSD**) and he reported that brought everything out of the noise except a couple of the weaker transponders.

The Russian Ghorizont IV channels are 50 MHz wide and they align as follows:

Transponder	Center Frequency	US Equivalent
1	3675 MHz	None
2	3725 MHz	1+
3	3775 MHz	3+
4	3825 MHz	6+
5	3875 MHz(1)	9-
6	3925 MHz	11-

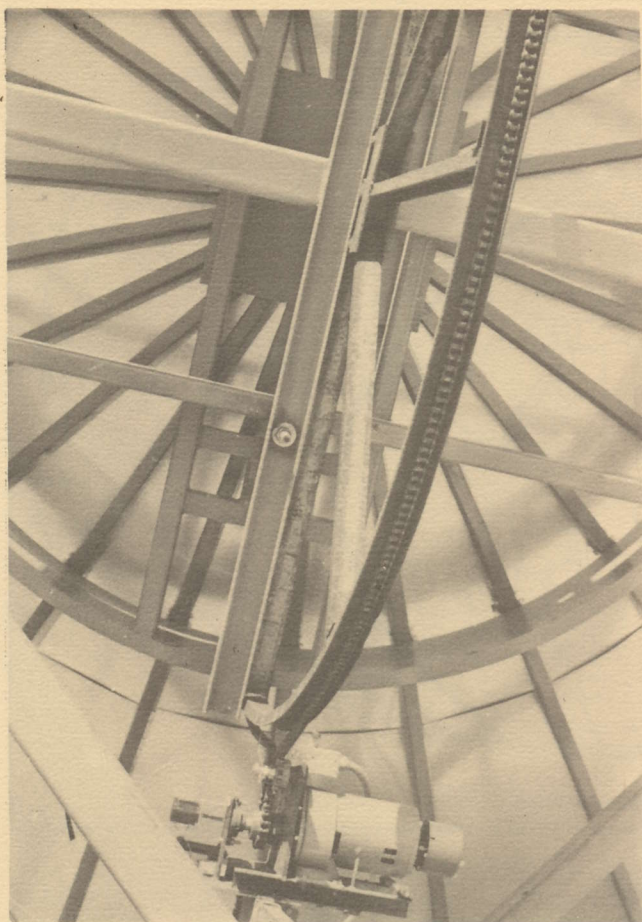
1 - Same as Molniya channel.





IT IS A GOOD THING Behar's 32nd place street runs more or less east and west or he would never have gotten Ghorizont IV in over the tops of the buildings to his east! [Now that is a low look angle.]





**MOTOR + CHAIN DRIVE** on Behar's Hialeah 16 foot Paraframe dish.



**YUP - that's you-know-who [second from right] applauding his team. Wonder where that door behind the dignitaries leads?**

Now what can you expect to find on each? Well, remember that England's Birkill finds **all** of the signals **about equal** in level in **Europe**. Behar finds to the contrary in Miami and another observer on the northern coast of South America also finds to the contrary. This simply says that the Russians are playing some tricks with their Global beam patterns; some are

'canted' or semi-directionalized if what our two western hemisphere observers report proves to be universally correct (we believe it will so prove).

Transponder	Relative Signal Quality
1	<b>Very strong</b> , equal to 5 (+ 32 dBw estimated)
2	Noisy color signal, (+ 28 dBw estimated)
3	SCPC or no signals at all
4	Noisy color signal (+ 26 dBw estimated)
5	<b>Very strong</b> , equal to 1 (+ 32 dBw estimated)
6	Very noisy signal (+ 24 dBw estimated)

Keep in mind these are the Russian transponder numbers, not the US equivalents.

**Now to the matter** of recovering Russian SECAM (or European PAL) color from the IV bird (or Molniya as far as that goes). In the Miami area there are plenty of Sony model **KV2012ME receivers** on the open market. These sets are designed for use in the Caribbean and South America and they are multi-everything (110, 220 VAC). Behar **warns** people who acquire the receivers to pay careful attention to the isolated chassis construction; the antenna input is 300 ohms and it is isolated from the chassis with coupling/blocking caps. **Don't** attempt to go **directly** to the chassis tuner with a 75 ohm line!

This last observation. Behar noted that the Russians were 'renting' their bird to UPI News and the Independent TV Network (ITVN) after 6 PM eastern to feed brief, film and tape footage of the day's Olympic events back to the US. Yes, that is an interesting **commercial** use of Ghorizont and it also says that someplace in the US there was a terminal (commercial) directed at Ghorizont. In fact if you saw ITVN or UP Olympic coverage during the games it probably got to the states in this manner. He also saw several hours of special feeds being sent to Cuba including two-way dialogue between the Cuban receive terminal operators and the Russian uplink terminal operators; all duplexed on a Ghorizont sub-carrier channel!

## ANTI-PIRACY LEGISLATION TEXT

### A BILL

To amend the Communications Act of 1934 to prohibit the unauthorized interception and use of subscription telecommunications and to protect the privacy of the users of such telecommunications.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.,

That the Communications Act of 1934 (47 U.S.C. 15 et seq.) is amended by inserting after section 5 the following new section:

#### "UNAUTHORIZED INTERCEPTION AND USE OF SUBSCRIPTION TELECOMMUNICATIONS

"SEC. 6 (a)(1) Except as provided in paragraph (4), a person who...

"(A) knowingly carries out an unauthorized interception of a subscription telecommunication; or



"(B) knowingly attempts to carry out, or conspires to carry out, an unauthorized interception; shall be liable for civil penalties under subsection (b) and shall be subject to criminal penalties under subsection (c)(1).

"(2) Except as provided in paragraph (4), a person who...

"(A) knowingly carries out an unauthorized interception of a subscription telecommunication; and

"(B) knowingly uses the subscription telecommunication for his own commercial advantage or financial gain, or for the commercial advantage or financial gain of any other person;

shall be liable for civil penalties under subsection (b) and shall be subject to criminal penalties under subsection (c)(2).

"(3) For purposes of this subsection, the interception of a subscription telecommunication by any person shall not be considered an unauthorized interception if...

"(A) such person is the originator of the subscription telecommunication; or his agent;

"(B) such person has agreed to pay a fee or charge to the person originating the subscription telecommunication, or his agent, for the use of the subscription telecommunication;

"(C) such person has entered into any other contractual arrangement or any other agreement under which such person is entitled to receive the subscription telecommunication from the person originating the subscription telecommunication, or his agent; or

"(D) such person has reasonable cause to believe that such person is entitled to receive the subscription telecommunication from the person originating the subscription telecommunication, or his agent.

"(4) The provisions of paragraph (1) and paragraph (2) shall not apply to any interception which is authorized under chapter 119 of title 18, United States Code.

"(b)(1)(A) Except as provided in subparagraph (B), any person who is aggrieved by any violation of subsection (a) may commence a civil action for actual damages, for damages under paragraph (2), and for equitable relief against the person who is alleged to have committed the violation.

"(B) No civil action may be commenced under subparagraph (A) after the end of the 2-year period following the date of the discovery of the alleged violation, or the 7-year period following the date of the occurrence of the alleged violation, whichever occurs first.

"(2) Any person who violates subsection (a) shall be liable to any aggrieved person for damages in the amount of \$100 per day for each day in which the violation occurs, except that any damages awarded under this paragraph shall not be more than \$1,000.

"(3) In any civil action under this subsection in which the court determines that the plaintiff has substantially prevailed, the court may assess against the defendant reasonable attorney fees and other costs of litigation reasonably incurred, and the court may award, for a violation of subsection (a)(2), such punitive damages as it considers appropriate. Any punitive damages awarded by a court under this paragraph shall be in addition to any other damages or equitable relief awarded by the court under this subsection.

"(4) Any civil action under this subsection may be commenced in any United States district court of competent jurisdiction, without regard to the amount in controversy, or in any other court of competent jurisdiction.

"(c)(1) Any person who violates subsection (a)(1) shall be fined not more than \$25,000, or imprisoned for not more than 1 year, or both.

"(2) Any person (other than an individual) who violates subsection (a)(2) shall be fined not more than \$1,000,000. Any individual who violates subsection (a)(2) shall be fined not more than \$250,000, or imprisoned for not more than 18 months, or both. If the conviction of the individual under this paragraph, the individual shall be fined not more than \$250,000, or imprisoned for not more than 40 months, or both.

"(d) The penalties established in this section shall be in lieu of any penalties established in any other provision of this Act.

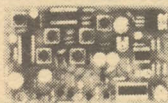
"(e) For purposes of this section:

"(1) The term 'basic telecommunications service'



## NEED PARTS...

Sat-tec's Got 'em!



## 70 MHz DEMODULATOR CARD

The Sat-tec D-1 demodulator is the last block in a TVRO system, it is where the 70 MHz IF signal is converted to video and audio. The D-1 contains a PLL demodulator, video processor (CCIR deemphasis, 4 MHz low pass filtering and 30 Hz clamp), dual sound sub-carrier demod and AFC circuitry. The power requirement is small, 15VDC @ 200ma., signal input is -20dbm @ 70 MHz. AFC will enable the user to lock most any VTO L.O. with no problem whatsoever. Video and audio outputs are a standard 1 volt p-p suitable for driving any monitor, VTR, or modulator.

## SPECIFICATIONS:

Signal input: 70 MHz at -20dbm (22mv)  
AFC lock range: greater than 5 MHz  
Sound subcarriers: 6.2 MHz and 6.8 MHz fully independent  
Video level out: std. 1 volt p-p  
Audio level out: 1 volt p-p  
Power requirements: 15VDC @ 200 ma  
Demodulator: NE564 PLL IC  
Tuning voltage out: 2 to 13.5 volts  
Tuning voltage in: 0 to 15 volts max.

D-1 Demodulator Kit ..... \$99.95  
D-1 Demodulator PC board only ..... \$49.95

Part Number	Description	Price Each
Avantek GPD-1002	1GHz, 12 db gain TO-8 can amplifier, 15VDC	\$45.00
Watkins-Johnson V802	2.5-3.7GHz VTO, lower noise than Avantek types	120.00
Watkins-Johnson V705	600-1000MHz VTO, lower noise than Avantek	120.00
Signetics NE564	PLL selected to operate at 70MHz	7.50
Vari-L DBM-500	4GHz mixer, SMA connectors	85.00
Amperex ATF-417	1GHz, 25db gain hybrid amplifier, 20-24VDC	19.00
Motorola MWA-110	400MHz, 14db gain, -2.5dbm	9.00
Motorola MWA-120	400MHz, 14db gain, +8dbm	9.75
Motorola MWA-220	600MHz, 10db gain, +10.5dbm	12.40
Motorola MWA-230	600MHz, 10db gain, +18.5dbm	13.50
Motorola MWA-310	1GHz, 8db gain, +3.5dbm	12.40
Motorola MWA-320	1GHz, 8db gain, +11.5dbm	13.50
Motorola BFR-90	3GHz F <sub>1</sub> NPN transistor, 15db gain @ 1.2GHz	2.50
Motorola MRF-901	3GHz F <sub>1</sub> NPN like BFR-90 but 2 emitter leads	2.75
Regulators: 7800 Series	5V, 8V, 12V, 15V, 1A TO-220	1.50
Regulators: 7900 Series	-5V, -8V, -12V, -15V, 1A TO-220	1.75
IF Transformer	10.7MHz IF can be padded to 6.2 or 6.8MHz	1.25
Tuning capacitor	10pf multi-turn for filters, PLL, etc.	.95
Coin form + can set	Nice coil form set for filters, good to 120MHz	2.00



Sat-tec Systems; Box 10101  
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charges, add 1% max.  
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## SELECT YOUR CATV SYSTEM

Satellite Programming  
INTELLIGENTLY...

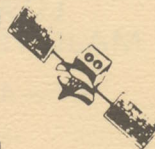
...with SAT-Guide

Twenty channels of programming today on FI, soon 35 on FI and D2. Keeping up with what is 'up', when, is almost impossible. Until SAT-Guide.

ALL FI programs on all transponders are listed in this unique programming guide to satellites. INCLUDES daily program listings PLUS monthly summaries of movies, sports and specials. Only \$28 per year from:

**SAT-Guide**  
Division of Commtek

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Hailey, ID 83333



means that basic two-way switched voice telephone service which is provided as an interstate telecommunications service on the effective date of this section and which is provided on a universal basis to the general public. Such term includes any other interstate telecommunications service which the Commission, from time to time, determines by rule is recognized as an essential part of an efficient nationwide system of basic telecommunications.

"(2) The term 'interception' means the receipt of any subscription telecommunication.

"(3) The term 'subscription telecommunication' means any telecommunication, other than basic telecommunications service, which is intended for receipt in intelligible form only by a person who has agreed to pay a fee or



charge to the person originating the telecommunication, or his agent, and any other telecommunication incident to such telecommunication.

"(4) The term 'telecommunication' means any transmission, emission, or reception of signs, signals, writings, images, and sound or intelligence of any nature by wire, radio, optical, or other electromagnetic systems."

## SATELLITE POTPOURRI

### CANADIAN UPDATE

The battle of words grinds on in Canada. The latest threat calls for a crack down on the use of satellite receive terminals in Canada **only where** such terminals are feeding Canadian licensed cable systems or broadcast (re-broadcast) transmitters.

The Vice-Chairman of the CRTC in Ottawa detailed in mid-July his agency plan to stop the 'illegal re-use of US domestic satellite signals' directed solely at those (Canadian)

firms whose broadcasting activities are licensed by the CRTC. VC Charles Dalfen explained **"The commission is not interested in the mere reception of satellite signals nor interested in the earth stations that receive these signals when the terminals are supplying television to remote communities with no other service"**. The CRTC now plans to prosecute approximately a dozen such terminals they have identified **"which compete with legitimate companies by retransmitting [satellite] signals"**. As an aside those found guilty of such activities will be subject to fines up to \$25,000.

Earlier this summer the CRTC, bowing to pressure from the Canadian cable television operator's association, vowed to prosecute any **and all** private terminals in Canada. This prompted Dr. Pat McGeer (Science and Communications Minister for the Province of British Columbia) to arrange to have a 3.8 meter terminal installed on the front lawn of the BC Parliament building. Dr. McGeer in effect challenged the federal government to shut down 'his terminal first' before it began picking on the estimated 200 such terminals now operating in British Columbia alone. Dr. McGeer has repeatedly said **"Satellite broadcast reception is the best entertainment opportunity Canadians living in remote communities ever had and it is time people living in these communities had some support and encouragement"**.

Dr. McGeer has apparently been one of the few people in North America to actually check out the status of the purported agreements affecting such 'international' reception. His comments on this are instructive to not only the Canadians but Americans as well who fear what their legal jeopardy may be in privately tuning in Canadian satellite signals or other 'international' signals. Dr. McGeer: **"I have carefully read both the INTELSAT agreement of 1971 and the exchange of letters between Canada and the United States in 1972. These documents are silent on the question of personal reception of satellite broadcast signals except for the United States letter to Canada which suggests that interchange should be encouraged. I hope that Canada will pursue this (US) suggestion by encouraging American viewers to watch broadcasts on ANIK satellites!"**

The subject of illegal (their word) reception of US DOMSAT signals by Canadian private (and community) viewers has attracted a tremendous amount of press in Canada. And most of it is appearing in general circulation newspapers and magazines. Charles Dalfen of the CRTC estimates there are between 700 and 1,000 such dishes in Canada operating today. Nobody seems to know for sure how many there **really** are. The BC government encourages them and the Manitoba provincial government actually gives them away to TV-less communities (!).

Most Canadian observers and most Canadian government officials now seem resigned to this thought; **nobody** is going to bother **private home owners** who are operating terminals (in fact a recent CRTC announcement could be interpreted to mean that such terminals are now approved). Nor are community-owned systems where there is no 'profit motive' likely to face a close down. Some still mutter that these

### LOW NOISE AMPLIFIERS MAJOR BRANDS-Low Prices-Write!

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Add \$2.00 shipping and handling.

### GENUINE

### HOWARD TERMINAL PCCARDS

Bob Coleman and Tay Howard are now producing six PC cards which make duplication of the Howard Terminal (latest version) a snap!

- (A) Dual Conversion (4 GHz to 70 MHz) - \$25.00
- (B) 70 MHz IF and Filter - \$25.00
- (C) Howard Demodulator - \$40.00
- (D) Dual (2 channel) Audio - \$25.00
- (E) Single Channel Audio - \$15.00
- (F) AFC and Metering - \$15.00

These field proven and tested high quality boards are available as a five-board-package for \$99 package price (you receive A, B, C, E and F above). Included is complete documentation for construction and a list of parts stocking distributors.

**Order from:** Robert M. Coleman, Rte. 3, Box 58-A  
Travelers Rest, S.C. 29690



terminals **should be watching** Canadian signals, not American signals but the logic of that disappears when it becomes apparent that southern Canadians have either direct or cable access to US programs while their more northern cousins are lucky to have access to **any** programming.

And so it appears, for now at least, the way is clear for most Canadians who want private terminals or those scattered communities who want to install a non-profit terminal system to do so without fear of government reprisals. Earlier this summer Canadian newspaper writers were warning readers to 'Lock Up Your dishes - Here Come The Cops'. The tide has turned and Canada seems resigned, to the fact that you can't block satellite signals at the borders nor can you deny remote citizens access to their programs unless you are willing to offer alternatives. And for the time being the cost of offering alternatives is apparently far beyond the reach of the Canadian budget so reception of US satellite signals will move ahead without government interference.

## PROGRAMMING CORRESPONDENCE

### UP AND RUNNIN' IN D.R.

I attended the SPTS '80 meeting in Miami this past February and thought you might wish to know what progress we have made since that time. Initially I constructed a 16 foot dish, equipped it with the Microdyne X1 receiver and a 100 degree K LNA. With this installation I get excellent pictures on COMSTAR D3, a signal with slight noise from SATCOM F1 and pictures with quite a bit of noise from COMSTAR D-2 and WESTAR I. More recently I have installed a pair of systems for customers utilizing the 16 foot STARVIEW dish and similar electronics with identical results. I am now starting construction on a 24 foot diameter dish for a local customer and I hope this will be the solution to eliminate the noise spikes found still on F1 with a 16 foot antenna. When I have finished I will send to you my results for publication in **CSD**. Can you tell me (1) if in the near future COMSTAR D3 will be carrying more video (it now only has the Saturday afternoon baseball game sent to Puerto Rico with an audio subcarrier on 5.8 MHz), (2) where I can get an 80 degree Kelvin LNA, (3) when the amateur group that discusses satellites operates and where (I am HI8BLF), and, (4) where I can obtain a less expensive down converter that can be coupled to the Microdyne 1100 (X1) receiver to avoid down line losses?

Vinicio Lambert  
Santo Domingo  
Dominican Republic

**Delighted to see your attendance at Miami SPTS has put you into the TVRO business in the central Caribbean! D3 is not likely to have heavy TV use in the near future although D2 [which you said has much noise] is expanding to perhaps 10 or so channels of cable TV service during this fall. WESTAR 3 (which you did not mention) now has several cable TV channels and it may have up to five or so by the middle of next year. Until**

**F11 launches and is operational late in 1981 (with perhaps another 2 dB or so of signal in your direction) F1 will remain your best bet. 80 degree Kelvin LNAs are very difficult to find but Amplica (950 Lawrence Drive, Newbury Park, CA 91320) and Avantek (3175 Bowers Avenue, Santa Clara, CA 95051) both have them from time to time. Sit down for the price however - typically over \$3,000. The ham group continues to meet on 14.311 on Sundays at 1800 GMT (1900 GMT later this fall after daylight savings time ends). You might catch Coop this fall from the Caribbean as VP5D (or VP5DX) on most any HF band or even two meters. Tacking an outdoor down converter at the antenna, ahead of the 1100 Microdyne, is feasible but probably not a terribly good idea. You'd have to go into the Microdyne at the IF (matching the output of your antenna-mounted down converter) and run tuning voltages outside to the down converter. Another approach is the complete 'everything at the dish' receiver which STARVIEW Systems now has available.**

### QUICK TO START

I thoroughly enjoyed SPTS '80 San Jose, meeting the Coopers, the exhibitors and shoppers like myself. Enclosed you will find some snapshots of my new, operating earth terminal. Thanks to the 'SPTS '80 Price War' on most items I got started in a big hurry. I am having a ball tuning in all of the satellites to the south and southwest from my location and surprisingly if I have my antenna pointed right on the button I have almost non-existent sparklies with the following equipment: (1) Andrews 8' parabolic, (2) Avantek 120 degree LNA, (3) Chaparral 'Super-Feed', (4) Alliance U-100 rotor, (5) ICM receiver with AFC (the 4200 and remote package), (6) Radio Shack TV Interface modulator and power supply kits and about 20 feet of RG-214. The manuals I obtained at SPTS '80 San Jose are really excellent; they are the 'Coop's Satellite Operations Manual' and 'The Gibson Satellite Navigation Manual'. Some of the single sideband signals encountered while 'tuning around' were explained very nicely in the Coop's Manual and it solves a lot of wonderment on my part. I think they are both worth at least \$100 each!

C. Munnell  
La Mesa, CA 92041

**Steve Gibson's Navigation Manual outsold all others at San Jose with Nelson's Parabolic and Coop's Operations Manuals a strong second. And who says you have to have a 12 foot antenna in California!**



MUNNELL's 8 foot Andrew dish.



**FIBERGLASS ROD AVAILABLE**

I was very pleased with your efforts with my new Manual and I enjoyed your comments on starting 'cottage industry' by building dishes. Judging from the telephone queries and mail already arriving, dozens of people have already gotten the bug. One of the things I am hearing from users of the Manual however is that the fiberglass rod called for in the Manual may not be universally available throughout the United States. If you wish to suggest to your readers a US source for the fiberglass rod by all means go ahead and do so. I do not personally know of one. Fiberglass of Canada, who supplies the rod to us, just went up 30% in pricing and I understand resin prices are also going up. For those users of my Manual who need small quantities of the rod, we can supply a 3 meter length (9'7") of the 3/8" rod for \$5.00 and a similar length of the 1/2" rod for \$7.50 as long as our price stays the same. This is in Canadian funds which means US dollar orders will be lower by the then current exchange rate. Shipping is on top of this.

Now that I am back in Montreal my first efforts will be directed towards a new feed system. I was nothing short of overwhelmed by the observed difference in feedhorn performance at San Jose and was extremely impressed with the performance of the Lindsay 'Scalar' feed.

Nelson Ethier  
Comm-Plus  
3680 Cote Vertu  
St-Laurent, Quebec H4R 1P8  
Canada (514-337-7255)

**Nelson also has a fantastic supply of N type fittings which he is willing to part with to those builders who need a few of this and that. Other than one chap in Vermont who took exception to some of the formula-math work in Nelson's new parabolic antenna Manual we have heard nothing but praise for his straight-forward approach to building high quality antennas in your garage. How many 'new' antenna suppliers will be exhibiting at Houston in November because they bought one of the Nelson's new manuals and went into business for themselves?**

**HIDDEN DISH?**

In regard to 'hiding' a home TVRO antenna, could you do an article in CSD telling us what types of materials are opaque and which type impede the flow of 4 GHz signals?

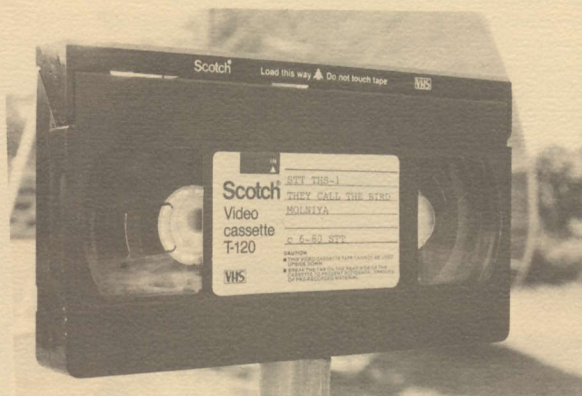
Art LeMay  
Hope, British Columbia

**Bob Luly during SPTS San Jose told us he had placed his 10 foot Umbrella antenna inside a number of enclosures to test what materials degraded 4 GHz signal flight. He notes that virtually any fiberglass material (such as you would purchase to enclose a backyard green or hot house for example) or styro-foam blocks up to a foot thick (he couldn't locate any thicker) seemed not to block 4 GHz energy at all; even when the signals entered at a 'cutting angle' through the material. We'd publish some hard data if somebody would provide it in common sense layman form. His \$395 JC Penny 'Dome Tent' (with plastic interlocking support tubes) certainly didn't hurt the 4 GHz signals any!**

**EYE OPENER**

I would just like you to know how impressed I was with SPTS '80 in San Jose. I must admit that I was a little apprehensive about your claims prior to the show. Now however I know you should have been even more optimistic in your projections. Over the years I have been to many, many conventions. This was by far the best! Your program, the pre-planning for the hotel and MATV system playback, the exhibits and the whole atmosphere was designed and implemented in a totally professional manner. While you had projected a large number of MATV hours my wife had to make a trip to downtown San Francisco to get another case of VHS videotape. Two recorders and some 23 four hour tapes later the entire program was recorded. I too was surprised at the make

## THEY CALL THIS BIRD MOLNIYA



A whole family of Russian satellites circling over North America and beaming live Russian television back into the USSR. Now because STT has researched the Molniya reception challenge and developed hardware modifications and software systems to produce high quality Russian television throughout North America, you can share in the excitement of this ultimate satellite TV fantasy!

**Until you have witnessed Russia's approach to national television service, you cannot appreciate how fortunate we are to have a multi-channel national service of our own!**

STT has put together a 90 minute (approximate) special videotape that explains in great detail how you set up to receive the Russian Molniya transmissions. All of the technical changes required plus a thorough understanding of the unusual moving/inclined-orbit of the Molniya series birds is explained in this special tape.

**PLUS** - this tape includes a report on the San Jose SPTS reception of Molniya and an interview conducted at STT in mid-July with English experimenter Steve Birkill who pioneered reception from both Molniya and Russia's Ghorizont Clarke-orbit birds.

**STT videotape THS-1** is available for immediate shipment. Specify VHS or BETA format. Price \$60 postage paid US and Canada; \$65 (US funds) outside of US Canada.

**STT** P. O. Box G, Arcadia, OK 73007 405/396-2574



up of the people attending the Seminar. I was rather surprised to see that most people were only talking and not buying or making any firm commitments. This was not the case as far as we were concerned. We did establish firm dealer-manufacturer relations. I even called one of my partners to make an unscheduled 380 mile one way trip to drive the Starview 10' dish on the trailer mount. We bought this demo unit as well as several other items and we are now totally operational having, since SPTS, made some significant contacts to potential buyers.

In my opinion SPTS San Jose was a total success. We were there the entire time from early Thursday to late on Sunday night. It was an exhausting few days that was totally worth the time and effort involved. I look forward to another SPTS!

Dan W. Weggeland, Snr. Partner  
Instructional Media Associates  
Palo Cedro, CA 96073

As a person who knew little or nothing about TVROs I came away from San Jose with a wealth of knowledge. The organization of the meetings, 2 per hour, with ample time for meals, displays and talk, made the time a very rewarding experience. Your use of 'TV' to keep us informed and in particular the daily 8:07 (AM) live program got me up and really fired each day. The sharing of information by the speakers as well as the other participants added to the quality of the San Jose workshop.

I can go on and on with superlatives but the thing I came away with that so impressed me was the creative, give it a try atmosphere! People trying new things, learning, sometimes failing and then trying again. I am very interested in getting into satellite conferencing and so after attending the workshop and talking with people it seems very possible. It will require getting out there and talking up different delivery systems but I now know it can be done. Thanks for the creative experience!

Terrence J. Thompson  
TSB Communications  
Belcourt, ND 58316

**We promise to keep SPTS/SBOC events creative and energy charged. The forth coming November 17-18-19 SBOC in Houston will shift emphasis slightly to the business opportunities of all of this but in doing so we expect to bring in new minds that we haven't heard from before. Can you imagine having Ted Turner stand up there and tell us all what it takes to crack the media giants over the head and how to do it yourself? That's the approach we are taking with Houston and we look forward to seeing all of you there.**

## A FREE SUPER UNLINK?

I would like to take this opportunity to thank you and your colleagues for a most enjoyable SPTS. This was my first and it will not be my last! As you may recall I spoke briefly with you about the NASA-Rosman facility. This North Carolina installation of NASA is scheduled to close on 1 January. It is imperative that somebody get on the ball **now** to figure out a way to keep it active so that groups like those attending SPTS in San Jose can have access to a modern, fully operational uplink system. This is a 600 acre site on US National Forest property. When this space facility was fully operational it employed a maximum of 300 people and had an annual operating budget of around \$5 million.

Since NASA and the US Forest Service both would like to see the facility kept open, it is 'on the block' for any group that can come in and run it; they only need to maintain it in operating condition. Lacking that kind of arrangement it will be torn down and that will be the end of that. I can envision a users consortium taking over the responsibility for running it and making it available for uplinking to other user groups for just the costs of actual use. This might be a less than 24 hour per day operation under those conditions and could get by with ten or fewer people. The site is superbly equipped with a pair of 85 foot dishes that even have Lunar ranging capability. The whole facility could be used for everything from uplinking to engineering training to research in basic low cost space



## SATELLITE TV RECEPTION MADE EASIER!

For those who are working with the Coleman or Howard TVRO system Manuals, here is a selection of PC boards, kits or assembled units which will get you 'up' and 'on-the-air' much sooner!

The following boards piggy-back to our LNA amplifier and active mixer boards to provide you with regulated powering for the important low noise amplifier stage(s):

Model	PC Board Only	Kit	Wired/ Tested
MRR (active mix biasing)	\$3.00	\$10.	\$20.
BSAB (bipole sgl bias)	\$3.00	\$10.	\$20.
FDAB (FET dual bias)	\$3.00	\$20.	\$30.

To recover satellite audio here are a pair of systems designed to provide 4 to 8 MHz tuning for subcarriers. When ordering wired and tested, specify subcarrier frequency. All boards edge mount for easy 'stacking' /switching.

Model	PC Board Only	Kit	Wired/ Tested
SAA-2	\$3.00	\$15.00	\$25.00

If you are fighting the battle of a suitable 70 MHz IF system **with** a built-in demodulator **plus** a channel 3 RF remodulator, here's your answer! To add audio, order one or more SAA boards. HOWARD Manual required.

Model	PC Board Only	Kit	Wired/ Tested
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## ROHNER MACHINE WORKS

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technology.

Governor Jim Hunt has written to President Carter suggesting that the site become a Center for International Studies. We are presently working with the Governor's office here to try to get their full support. Under consideration is a national teleconference to show a large number of potential users the full facility. If we could put together such a teleconference we think CSD readers could be local 'missionaries' to show off the teleconference to local educational institutions and other people who together might be able to save the site and put it to good use.

We noticed an article in a recent CSD about the formation of a national (or international) users network or group. This site could be the uplink for that purpose but we need to get moving on it now to either work out a plan before 1 January or stall the close down until something can be worked out. What do others think?

Mike Eastern  
Assistant Director  
Interworld, Inc.  
112 Terrace Avenue  
Elkin, N.C. 28621

**We think this has so many possibilities that it might take a very long time to even zero in on the basic problem; keeping the uplink operational. Mike is telling us that a major US facility is closing down; that Uncle Sam wants to lock the doors and walk away leaving a pair of 85 foot antennas plus buildings filled with uplink and receiving gear for the rats and squirrels to inhabit. We also think that with the onrush of space this approach stinks. Mike broached the problem to the SPACE Board of Directors in San Jose and they appointed a two man committee (Robert Coleman and Ralph Payne) to look into it. But SPACE is up to its earlobes in HR 7747 alligators at the moment and the timing is not good for our new trade association to help out on this one. Out there are several thousands of creative readers. We suggest that an ad hoc**



committee be formed instantly; just anybody interested in trying to figure out how such a giant facility can be saved and put back to work. We will support you here in CSD by spreading the word and even sponsoring a 'Save Rosman' fund. By the time we get to Houston's SBOC you guys can hopefully have some solid suggestions worked out and have the exact cost of saving the site on a shoe-string budget worked out. If you do we'll make room on the SBOC program in Houston for you to present it to the rest of us. Call Mike at 919-367-7251 or 835-7226. Saving whales is neat; saving dual-85 foot uplink equipped sites is exciting!!!

#### UHF MODULATOR?

I have nothing but high praise to offer for CSD. Finally there is one darned good source to learn up to date information about satellite television technology as well as the business angles that are developing. I would like to see in the near future a construction article for a high quality visual-aural modulator with output in the UHF band (i.e. channels 14-83). Some requirements would include crystal control, vestigial sideband filter, 75 ohm output at about +50/55 dBmV. This is probably a tough assignment but I feel there is a definite need for such a device especially in an area where all 12 VHF TV channels are already filled (cable TV) and supplying mid or super band converters would be cost prohibitive.

N.A. Anderson  
Anderson Electronics  
Red Wing, MN 55066

Triple Crown Electronics (42 Racine Road, Rexdale, Ontario, M9W 2Z3, Canada) does have a UHF modulator (write Charles Evans there). One possibility might be to take a VHF modulator and mix the output up to a UHF band channel with all of the sideband filter and good quality stuff at VHF (or i.f. as is the practice today). Getting +50/55 dBmV at UHF after conversion would be the trick although there are a number of solid state linear amplification devices on the market which could be made to do that job (and several dB more...like watts). Here is a project for a reader that could probably be turned into a saleable product in short order. Who wants to tackle it?

#### NO LNA

I am in the process of building a home TVRO and I would like to know if in mid-Oklahoma it is possible to get a picture with NO LNA? I would start off with the mixer, LO, IF and baseband section and then add the LNA later on.

Larry Park  
Oklahoma City, OK 73112

With a 10-12 foot antenna in the central portion of the United States it is possible to see sync and perhaps the outline of a picture with a typical VARI-L DBM500 mixer on the WESTAR I and II birds. But when you add your first couple of LNA stages there will be all of the difference in the world!

#### MOTHER FANS

I have recently read Coop's interview in the Plowboy section of the May/June MOTHER EARTH NEWS and I applaud the effort. I've been in the production end of this business of broadcasting for 18 years, read a number of trade journals, and I have never had the technical aspects of the satellite TV developments laid out before me so simply and clearly.

Jerry A. Johnson  
General Sales Manager, KICT  
Wichita, KS 67235

I read Bob Cooper's interview in MOTHER EARTH NEWS with great interest. I am a student studying electronics while incarcerated at the Fort Grant Training Center. We would like to put a satellite system in because we are so far out in the mountains that what little reception we do receive is very weak. Our fund however would never allow such an installation so I am writing on behalf of all of the men here to see if you can

help us locate a firm that would be willing to donate to us a small system. Such a donation would be tax deductible under 501C3 code of the IRS, and the system would belong to the institution. Another option, perhaps, is to set up a system here for the publicity.

Steve Griffith  
39708  
Box R4000  
Ft. Grant, AZ 85643

While we doubt there are any suppliers looking for a 501C3 tax donation or publicity to sell terminals, we appreciate your interest. Certainly a lot of interest in terminals for 'points of incarceration' these days!

#### BIG STUFF IN PANAMA

I would like to pass along some information for anyone in South or Central America. Here in Panama there is already a working TVRO. It has an 11 meter (that's not feet folks!) dish and redundant cooled parametric low noise amplifiers; 33 degrees Kelvin. With this super equipment it can only receive about ten of the transponders on SATCOM F1 and 2 transponders on F2. Anyone south of Costa Rica ought to be very careful before buying a TVRO since this experience indicates that at least for SATCOM transponders the going is rough. The system mentioned, by the way, is planning to upgrade to a 15 meter dish and even then they may not be able to receive all of the F1 transponders. As an aside, the 33 degree K LNAs cost them \$40,000...each!

Martin Duffy  
Giroelectronica, S.A.  
Panama, Panama

Panama is so far outside of the forecast or measured F1 and F2 footprints that even RCA refuses to guesstimate the signal levels likely. Outside of the 26-28 dBw contours an effect known as 'ridging' takes place, the result of transmitting antenna sidelobes. Very small distances on the ground can make big differences in the signal level with 'hot' and 'cold' ridges interspersed. The lucky ones get a ridge (which most likely will only be for one or two of the six-channel antenna sets on F1 or F2) and the unlucky ones get the opposite of a ridge which is a null. The same effect is also apparent on the COMSTAR birds although WESTAR and ANIK don't seem to have it, possibly because of their less complicated downlink feed horn arrangements on their respective birds.

#### REF SWAN POINTING

Your Radio-Electronics article (February 1980) recommends aiming the Swan antenna boresight at a point 118 degrees west. Using my own position in Denver and the +/-20 degree boresight angle variation, a Swan here would see the satellites parked from 105 west to 132.6 west, not 98 to 138 as you state. Aiming the antenna at 116 west and designing the mount to allow a +/-10 degree rotation of the reflector then satellites parked between 95 west and 139 west can be monitored. I believe the difference between the antenna viewing angle (+/-20 degrees) and the portion of the orbit seen will increase at the ground station approaches the equator, thereby requiring greater antenna mount movement to see the same portion of the satellite orbit.

Dennis Trusty  
Evergreen Co.

Most of the Swan design antenna advantages are lost when the feed and the LNA must be as much as 7.5 meters above ground which is the case when we have nearly vertical pointing angles here in the tropics.

G. Presley  
Christmas Island  
Indian Ocean

While it is possible to tilt the reflector surface to create an



angle-of-arrival/angle-of-release relationship to suit your particular feed location desires in most latitudes, close to the equator as well as close to the pole[s] you certainly do lose that advantage. Close to the equator the antenna feed would indeed have to be high above ground while close to the pole[s] just the opposite would be true.

#### APPRECIATES THE IDEA

By an odd coincidence your kind suggestion appearing in the March issue of CSD that the geostationary orbit belt be re-named after the undersigned arrived in the same mail with my annual quarterly dividend check from COMSAT; \$2.05. Need I say which gave me the most pleasure?

Arthur C. Clarke  
Colombo, Sri Lanka

At \$2.05 per quarter Arthur will be saving his dividend checks for quite some time before he can acquire his own 'private terminal'. We suggested in our December CSD that some sharp equipment supplier ought to jump at the opportunity to go to Sri Lanka and supply Arthur with a 'donated' TVRO; in exchange for the right to advertise that the 'father of satellites' receives his television on an 'XYZ Terminal'. We've heard from two such suppliers since then; and if everything goes OK several of us may drop in on Arthur this coming spring to install a terminal for him there. Boy, will that make a neat report for CSD!

## BIRD OPERATIONAL NOTES

**LATEST COMSAT** rumors suggest the US representative in INTELSAT may be having second thoughts about the DBS business after all. Primary problem appears to be COMSAT's inability to attract a partner in the venture. Best bets are that this may well drag out in state of limbo several more months if not years.

**FCC** meanwhile has begun formal process of preparing for 1983 'Hemispheric Conference' that will follow up on WARC '79. Commission must evaluate what US needs are likely to be in DBS area through 2000 or further, create program to fit DBS into those forecasts without stepping on toes of other western hemisphere nations who perhaps have far greater need for orbit space and DBS service than US can justify. All of this is at 12 GHz of course.

**LOOK FOR** early start of 73 hour weekly feed interconnecting new STV stations owned by media giant Gene Autry this fall. Autry's firm is firing off new STV outlet in Oklahoma City with others for Omaha, Memphis, Dallas and Chicago close behind and he will use WESTAR bird to send first run R and PG movie fare to each station from west coast uplink site. Service will be called VEU.

**FCC** decision to allow cable systems to carry any programs they wish from any stations they wish could signal new rush to birds by indie stations; but don't bet on it. FCC lifted rules that required CATV systems to take service from indies closest to them during July but attitude of most cable firms seems to be that they would rather load up their channels with non-broadcast signals (i.e. such as Nickelodeon) than more

indie signals.

With **HR 7747** now before House for action FCC has jumped onto bandwagon; addressed subject in July and said it didn't like concept of piracy and would support legislation.

**LATEST** study by popular news weekly **Satellite Week** reports WTBS is most viewed satellite service (nearly 9 million US homes plus who knows how many in Canada!) while Christian Broadcasting Network (CBN) is not far behind at just over 8 million homes. CBN with **CSD** is sponsoring automatic 'registration' for approved satellite viewing (see this issue of CSD).

**A CANADIAN** group called Cablecom Corp. (8-1540 Alberta Avenue N., Saskatoon, Sask. S7K 1R6) is promoting national Canadian registry of private viewers who are watching SATCOM services. Firm hopes to collect funds from each on a voluntary basis and then see that US programming sources get paid for viewing.

**IN SPITE OF** blockade by US and partners against Moscow Olympics INTELSAT reports it had over 1,000 hours of 'time' booked for relay of game events to various nations around the world. Not reported was the amount of time 'sold' by Russians on Ghorizont series birds; as a report in this issue indicates at least Ghorizont IV was loaded daily and simple math suggests that hour total may have exceeded 500 hours over two weeks of games. Russians probably charged less than INTELSAT for their relay (to Cuba, etc.) but one US network decided **not** to use Ghorizont after Russians wanted \$78,000 for around an hour per day of feeds for two weeks.

Latest **MOLNIYA** bird launched went into orbit in mid-July according to European sources. Russians are known to keep several extra **MOLNIYA** 3 type birds in inclined orbit just in case one quits and they routinely retire them as early as three years after launch. One US observer reports he has found the Moscow-Washington hot line channel at around 3775 MHz; signal is typically 'tone' modulated.

**PROSPECT** of major channel changes on SATCOM, prior to late '81 launch of III-R, shaping up. **SHOWTIME** planning to add new type of service early in 1981, and will take transponder 17 back from Eastern Microwave that currently sub-lets for WOR. WOR will have to move to COMSTAR D2 at that point. **HBO's CINEMAX** service began service on transponder 20 1 August; mostly odd collection of specials, movies previously released on HBO regular service. **CINEMAX** will expand to transponder 23 for western US feed 1 September; low priced Take - 2 service ceased operating on 23 on 1 August also. **TRINITY's** transponder 13 on FI continues to be bad as much as it is good and Trinity/KTBN now set to feed dual on D-2 as well as FI. Several additional new services are rumored in cable arena; Las Vegas Entertainment Network to start regular service D2 (transponder 10, **vertical**) 1 September. The fall period promises to be a real battleground for various new services on D2 and **WESTAR III** who want to grab limelight from FI offerings.

**ANIK B** 12 GHz experimental service has expanded to Ontario with a new 'TV Ontario' feed. Fewer than 50 homes are believed equipped to receive service however. 'TV Ontario' is educational service.

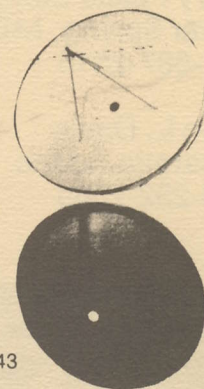
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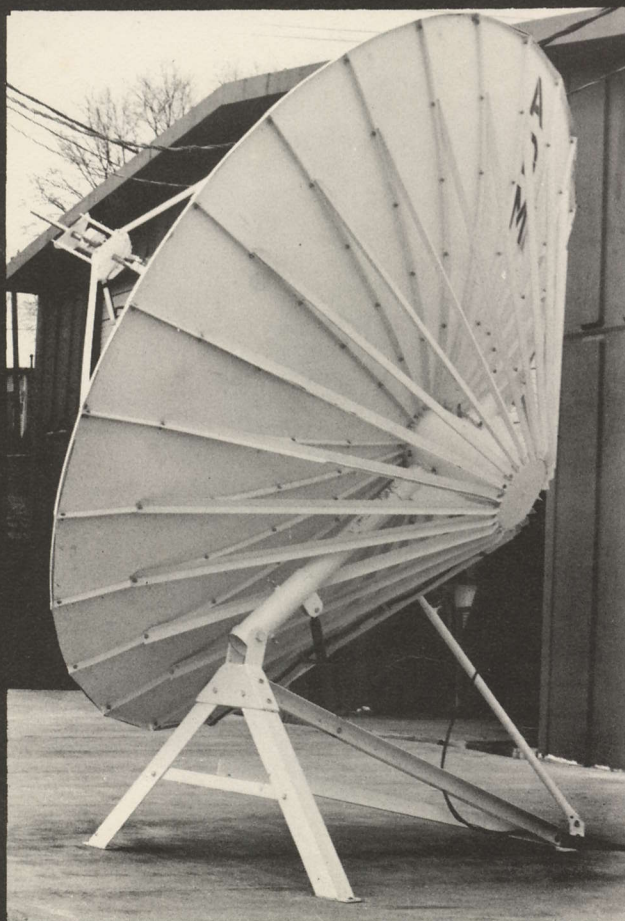
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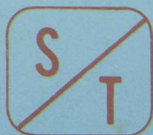
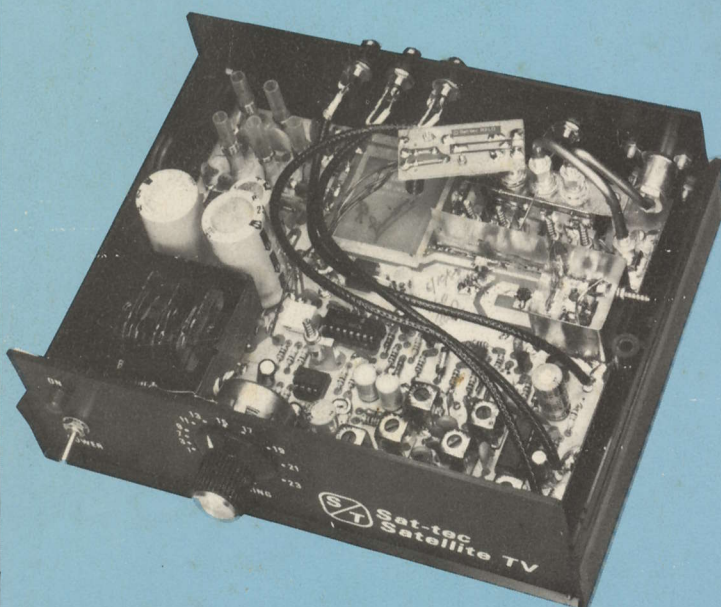


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